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ELECTRIC RAILWAY JOURNAL

MOSAIS BUCK
Engineering Editor
GEORGE J. MACMURRAY
CLIFFORD A. FAUST
CHARLES J. ROGGI
J. W. MCCLOY

LOUIS F. STOLL
Publishing Director

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*Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884*

JOHN A. MILLER, JR., *Editor*

Pages 445-494

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Contents of This Issue

SEPTEMBER, 1931

Copyright, 1931, by McGraw-Hill Publishing Company, Inc.

Editorials	445
Government in Business Is Disastrous Business.....	448
By JOHN SPARGO	
Modernized Maintenance Facilities Effect Improvement in Bus Performance	451
By C. B. LINDSEY	
Midwest Associations Have Profitable Convention at Denver.....	455
Who Should Pay for High-Speed Transit?	458
By HORACE GROSKIN	
Indiana Railroad Spends \$980,000 for New Cars	462
Analysis of the Financial Situation Found Helpful.....	464
Kansas City Reorganizes Distribution System.....	467
Broad Field of Use for the Trolley Bus	469
By CHARLES GUERNSEY	
Riding Increased in Milwaukee by Weekly Pass and Fare Experiment	471
Trend of Revenues and Expenses.....	474
Individual Awards Made in Maintenance Contest	476
Practical Maintenance Ideas:	
Drill and Sleeve Fastened to the Boring Machine—By W. J. McCallum.....	477
Adjustable Vise for Bus Generators—By Farrell Tipton ..	477
Positive-Acting Mechanism for Track Switches—By M. W. Wales ..	
Straightening Axles in the Wheel Press—By Terence Scullin ..	
New Equipment for Rail	
A.E.R.A. Annou	
News of the I	



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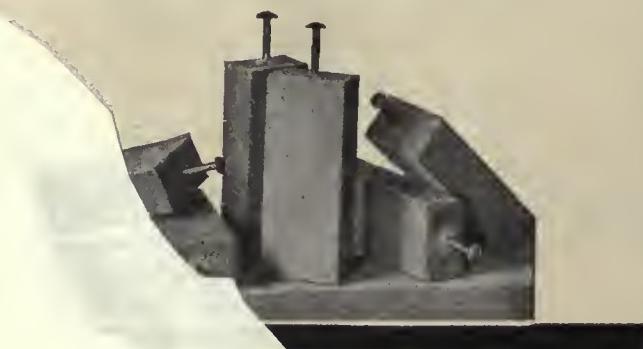
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AND SO CHRISTCHURCH

Adopts the Trolley Bus



A portion of the overhead trolley bus system at Christchurch showing the wide use of O-B line material. O-B crossovers, insulators, spring-lock hangers, and Marathon Ears figure prominently in the construction.

THE Christchurch (New Zealand) Tramway Board recently was faced with the problem of worn out track on a seven-mile, money-losing line. Investigations led to the conclusion that a trolley bus system would not only cost less to install, but what was equally important, would regain enough lost patronage to make the line pay.

Consequently, seven route miles of overhead were constructed or adapted to trolley bus operation, and six new 70 h.p. buses were ordered. The material for the overhead included O-B mechanical switching frogs, mechanical crossovers, fixed crossovers, insulated approaches, insulated crossovers, spring-lock hangers, and Marathon Ears. The bus equipment included O-B retrievers for all buses, and O-B six-spring trolley bases, together with O-B swivel harps, are being installed for trial.

Three buses are in operation at the present time and their great popularity with the public assures the success of the line with the full schedule in operation. The general public is not slow to appreciate the speed which is maintained by the buses, and enthusiastic comments have been made on their quietness, smooth acceleration, cleanliness, and curb loading.

There is no question about the popularity of the trolley bus with the riding public. Where there has been opportunity to experience its admirable performance and riding qualities, approval has been indicated, not in idle, meaningless words, but in the most convincing of all manners—by an increase in profitable revenue.



These modern trolley buses are equipped with O-B retrievers which protect the overhead in event of dewirements.



The quietness, rapid and smooth acceleration, cleanliness, and curb loading of these trolley buses have led to increased patronage on this line.



YOU GET PAID *for Using this Wheel*

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If \$3.79 net profit per car seems insignificant, estimate how many passengers it is necessary to haul in order to earn a like amount. On the basis of eight cent fares and 6½% earnings, you get paid an increase equal to the profit from 758 fares.

Many companies are finding it highly profitable to make an immediate and complete change to O-B Wheels. Others find it no less desirable to make the transition by divisions. In this manner, the charge is made against maintenance, because the old type wheels are replaced as worn out.

Whichever method is best suited to your particular circumstances, any device that will effect savings equal to the profits from 758 extra passengers per car is especially valuable at this time. And, according to the records, O-B Wheels are doing such things on a number of properties.



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A Summary of Features

1.

Perfect ventilation based on modern school and public building standards.

2.

Temperature of 60° easily maintained in zero weather.

3.

Eliminates all gas and other odors.

4.

There are no drafts as air is introduced at a temperature close to that of the human body.

5.

Cold drafts from window cracks are prevented as the air current is reversed.

6.

Aisleways are kept drier.

7.

Uniform temperature throughout the vehicle.

8.

Easy control of heat supply.

9.

Absolute elimination of gas hazard and fire hazard.

10.

Windows kept free of frost.

11.

Drivers are less subject to fatigue under healthful working conditions.

12.

Simple to install.

13.

Low cost and no cost to operate.

14.

Definite saving in gasoline by reason of normal motor operating temperature.

15.

Occupies no valuable space in the vehicle.

16.

No rotating parts to wear out.

17.

Accessible and quickly removable.

18.

Interferes in no way with motor operation.

19.

No pipes or joints to corrode or leak.

20.

The system is compact and under easy observation of the mechanic.

21.

Warm, odorless buses have a decided revenue producing value.

Install the Mueller-Evans Heating and Ventilating System

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Further evidence that this type of equipment has established a new standard of interurban service is the recent purchase of ten high-speed cars by the Philadelphia and Western Railroad — equipped with GE-706 motors, G-E compressors, and G-E Type PC control.



*Smoking compartment in
Indiana Railroad car*



*One of ten G-E equipped cars of
Cincinnati and Lake Erie Railroad*

*One of thirty-five G-E equipped cars
of Indiana Railroad*

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TRANSPORTATION EQUIPMENT

ELECTRIC RAILWAY JOURNAL

New York,
September, 1931

*Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884*

JOHN A. MILLER, JR., *Editor*

Volume 75
Number 9

Belated Opposition at Chicago

WITH developments looking toward the consolidation of the surface railways and the elevated lines in Chicago into a unified system approaching a climax by the removal of the last of the court actions incident to the carrying out of the plan, it is particularly unfortunate that a group of security holders have at last come to the conclusion that they should not participate in the consolidation on a basis that they consider unfair to themselves. It seems unlikely, of course, that this element of discord will receive recognition that will delay final consummation of the plan, but that possibility is always inherent in actions of this kind.

To impute selfish motives to this element is beside the point. Its own attitude is that "even if the legal basis of the proposed plan of consolidation is adjudged sound, the plan should be rejected because of its unfairness and financial defects." Yet the consolidation plan was not declared operative until April 1 last after 90 per cent of the securities had been deposited. Another criticism, leveled by the dissenters, is that after the plan was declared operative, it was found necessary to test its legal basis in the courts. To others it would seem that this was an expedient intended as a safeguard.

Evidently the dissenters have in mind the proceedings to test the validity of the terminable permit, to determine whether or not the Chicago Local Transportation Company, formed to take over the surface and the elevated lines, is, in fact, a corporation, and whether the amendment to the Railroad Act, passed by the Legislature as part of the co-ordination legislation, will permit stockholders of the elevated lines to sell their property to the new company.

A vast amount of work has gone into the Chicago negotiation. Many interests had to be mollified. Enabling legislation had to be secured. Much time necessarily was consumed in arranging all these things. Even if the matter had been one of mere barter and trade between corporations not subject to political considerations and the influence of regulatory bodies, the negotiations for a consolidation such as that at Chicago could not have been concluded quickly. They never are, even where the corporations are going concerns not subject to public influence.

So a display of impatience at the belated move recently recorded is only natural. The transportation program at Chicago has probably come closer to general approval than any other major civic undertaking in the last 40 years of Chicago's advancement. It is unthinkable at this late hour that any development of the kind now under way should be permitted to interfere with the orderly consummation of the consolidation. As a matter of fact, as one of the disinterested advocates of unification said recently, it would, indeed, amount to a municipal calamity if the transportation program should now be unnecessarily delayed.



Reflections of Aroused Civic Consciousness

SOME measure of satisfaction for the electric railways is to be found in the favorable reactions reflected in the recent Winnipeg and Portland reports showing a disposition to a greater acceptance by the representatives of these communities of their obligations to the transportation companies. True, the suggestions have yet to take tangible form, but they show that the efforts which the companies in these cities have been making are beginning to bring results. The calf does not thrive that is fed on skimmed milk, nor does the city thrive that stands aside and permits its mass transportation agency to become undernourished on the fodder of inadequate income.

It seems strange that city officials, callous to the need for preserving the mass transportation agencies, go right ahead spending money lavishly for improvements that benefit the automobile user. Requirements of cities impose a tremendous burden on the mass transportation companies, particularly for equipment for peak riding—equipment far in excess of that required for the off-peak loads. Business men and the members of the municipal governing bodies give little or no thought to the problem thus created. Failing the retention of mass transportation upon a basis that provides for successful operation under private auspices, however, the prospect that confronts the cities is a direct subsidy or municipal ownership and operation. A city of any size without

a public transportation system is something to ponder. But it would be better to ponder it as an eventual possibility than to have to try to cope with it as a fact.

To recapitulate the points made in the Portland and the Winnipeg pronouncements is not necessary. They do, however, show enlightened approach on the part of public bodies to the problems of the railways and recognize the discriminations that are part of the load laid on their backs. The reports reiterate some of the ideas expressed by Mr. Sisson in his recent article in this paper, but they hold out the hope that the point of view stressed in the editorial, "Bringing Order Out of Chaos," in the JOURNAL for August, are gradually coming to be accepted.



Stay-at-Homes Will Miss a \$1,000,000 Display

EXPENDITURES totaling a large amount of money will be made during the next few weeks by the manufacturers of electric railway equipment in preparing the great exhibit of apparatus and appliances to be shown at the fiftieth annual convention of the American Electric Railway Association at Atlantic City. Everything indicates that this will be one of the best exhibits ever presented at an electric railway convention. Holding the annual convention at San Francisco last year resulted in an excellent meeting, but it was impossible for the manufacturers to have an exhibit. The 1931 exhibit, therefore, offers an opportunity for the delegates to view the progress of two years in apparatus and equipment design. Not only will there be an elaborate display in the convention hall, but there will also be a unique outdoor exhibit of various types of vehicles used in a modern system of co-ordinated transport. It will consist of ten individual units including a high-speed interurban car, large city street car, medium-size city street car, two trolley buses, four gasoline buses, all of varying capacities, and a taxicab. This exhibit will be on the Boardwalk throughout the week.

Electric railway executives have a real responsibility to see that full advantage is taken of what the manufacturers are doing in presenting the exhibit this year. The value of the exhibit will be lost if operating men are not in attendance in large numbers. While everyone recognizes the necessity to exercise all reasonable economies in this time of business depression, the money spent to send a substantial quota of operating men to the convention will undoubtedly be more than justified by what they will learn there.

It is of inestimable value to the industry that there be this periodic presentation of equipment and appliances. A similar display cannot be seen in any single manufacturer's show rooms, nor can it be carried around and shown in the various cities where the operating companies are located. It can be seen only at the Atlantic City convention. Men from all departments should be sent to observe and study it. Not only does the effort

of the manufacturers deserve this recognition, but the welfare of the operating companies requires that full advantage be taken of this unique opportunity to see and learn about the latest developments in transportation equipment.



A Tract on Courage

PULSES are quickened by the contents of annual reports such as that just made by the Cincinnati & Lake Erie Railroad. It is a document redolent not only of the work which that road is doing in a field beset with adverse conditions, but indirectly reminiscent of the similar work which the Interstate, the South Shore, the North Shore, the Milwaukee Electric, the Indiana Railroad, and others, have done and are doing.

There is no whining in the report. There might be real justification for complaint even for self-commiseration, but the management is not of that kidney. It is alert. It is alive and the report reflects that attitude. It tells the story of what the new cars are accomplishing, how freight traffic has been built up, how store-door pick-up and delivery service has been developed, how attractive passenger fares have stimulated business, how bus and rail have been effectively co-ordinated, how one-man car operation has been made successful in interurban service. In a sense, it might be said that the report is a tract on successful merchandising. It is also a tract on courage.

The document is significant not only on the score of what it tells, but also on the score of what it implies. It calls to mind the fact that not so long ago the now successful South Shore Line was not much more than a streak of rust in an industrial oasis. And it portends similar success for the Indiana Railroad under progressive management. On the other hand, the encouraging nature of this report emphasizes by contrast the sad fate that has overtaken some other roads similar in character, notably, the interurbans in central New York. To mention them is to lament their passing. That the methods followed by the roads in the Central West and by numerous others would have saved those in New York State may or may not be true, but at least the contrast in spirit and method provokes reflection.

It is begging the question to say that in many instances the effort to preserve roads of this kind is out of proportion to the possible reward that might follow the task of preserving them. Customs change, the state often is remiss in meeting its obligations to its own corporate creatures, there is unfairness everywhere. To deny these things is to evade evident facts. Changed economic conditions have put the interurban to a severe test. There would appear to be little hope for roads of this kind under direction that is not aggressive, progressive and fearless. But where vision and courage have been displayed in the management of these roads they have survived and are doing well.

Time to Burn the Old Books

LACK of progressiveness among the Chinese has been attributable in large measure to the teachings of Confucius, who placed great emphasis on ancestor worship. Any attempt to do something in a new or better way has been considered a reflection on one's forbears. If the old way was good enough for them, no one with a proper feeling of respect for his ancestors would try to change it. Realizing that this stifled progress and development, the Emperor Chin Hwang-Ti once endeavored, by burning all the old books upon which he could lay his hands, to turn the eyes of his people forward. In this he was only partially successful, but at least he deserves credit for making a valiant effort to strike off the shackles of tradition.

Perhaps no industry has suffered more than the electric railways through firm adherence to tradition. Attempts to do things in new ways have met with opposition on the ground that the established practice was good enough in the old days and consequently is good enough now. In reality the reverse is true. A considerable amount of business has been lost to competitive forms of transportation. It will never be regained by running the same old cars in the same old way. It can be regained only by the application of new methods. The industry must find a way to produce a product that appeals to the public, and a way to sell that product. Vigorous efforts to do this are being made on many properties. New methods, however, continue to meet opposition because they are contrary to established practice. It would seem that the time has come for the industry to follow the example of Chin Hwang-Ti in burning the old books.



No Room for Micawbers

Far too often railway managements, particularly on the smaller properties, take a defeatist attitude, accentuated by the current business depression. New cars, new tracks, are fine, say they, but where will the money come from? Still others await the perfection of new devices before they are ready to recommend the expenditure of large sums. Micawber-like, they are waiting for something to turn up that will stem the tide and swing them from adversity to prosperity. Experience has shown that the purchase of new equipment at considerable cost—planned and executed by an able management—often will make a decided difference in the fortunes of a property. But how can a management, that for years has failed to exhibit more than the most mediocre attainments, prove to its bankers that it will be able to spend wisely and obtain the anticipated results, should it get ample funds?

Plenty of possibilities exist for improvements in service without any capital. Frequently the adoption of a better maintenance policy will do wonders. The poorest

repair usually is the most expensive. Records of many companies prove that. Instead of spreading the maintenance money out thin all over the property, concentration on the most-used track and the most active equipment frequently will prevent failures on the road and eventually put all the property in better repair, as well as saving money. What is more, it will permit the transportation department to improve schedules and give a more reliable service. Here again is a real cash saving. Even in these days of intensive competition, better service will soon bring increased revenue. And finally, the better financial showing that is almost certain to be made is the most convincing argument to the board of directors that there really are possibilities for making money, and that the investment of new capital is justified.



Increasing Interest in the Trolley Bus

WHILE activities in the transportation field have kept abreast of business in general, few startling developments have taken place so far in 1931. On this account, it is particularly worthy of note that interest in the trolley bus, as evidenced by announcements of actual and proposed installations, has definitely increased.

Chicago started the ball rolling early in the year by accepting four trolley buses, received for trial in 1930, and by purchasing 25 additional vehicles. This was followed by reports from six electric railways that new installations will be made definitely this year. Peoria has ordered five vehicles and expects to inaugurate its service in September, while Memphis plans to open its 9.9-mile line with nine trolley buses about the middle of October. Following a trial operation of one vehicle for several months, Shreveport obtained permission to install a permanent system from the citizens who voted five to one in favor of the proposal at a special election. Service will be started early in November with five trolley buses. About the same time, Providence expects to inaugurate a system with four vehicles. The largest of the new installations will be made in Kenosha, where the entire street car and bus system will be replaced with 22 trolley buses. It is expected that the opening ceremonies for this important changeover will be held near the close of the year. Duluth is the sixth city with definite plans. It has ordered two vehicles for a trial line.

In addition to this activity, it is known that seven other electric railways have decided to install trolley buses and expect to make formal announcements in the near future. A total of 25 other companies are seriously contemplating installations. The twelve railways, now operating 207 vehicles, have proved that the trolley bus has an extensive field of usefulness. As the present systems expand and new installations are made, an even clearer concept of its proper place in the transportation field will be obtained.

Government in Business

Is Disastrous Business

By JOHN SPARGO

Regardless of the degree of technical proficiency that may sometimes be attained, municipal ownership and operation of transportation systems has serious disadvantages

BELIEF in government ownership and operation of industry as a panacea for the social and economic ills of society is widespread and deeply rooted. Having held that belief during many years and turned from it in the conviction that, at its very best, the panacea is the fecund breeder of ills worse than any of the ills it is designed to cure, or than all of them combined, I desire to set forth, in a spirit of cheerful good temper, some of the reasons which led to that radical change of opinion and faith.

During many years I was an ardent advocate of the socialist philosophy and program, including government ownership and operation of industry. That chapter in my life I do not seek to hide, neither do I offer any apology for it. On the whole, I am inclined to approve the cynical observation made by an English philosopher, many years ago: "Not to be a socialist at twenty means that something is wrong with the heart, to be one at fifty means that something is wrong with the head."

My present belief is that every extension of the powers and functions of government is to be feared and should be stoutly resisted by all who believe in real liberty. There is no greater danger than that resulting from the continual expansion of governmental functions and powers. It is better to be free men in an imperfectly organized state, progressing with many a stumble, than to be serfs in a perfectly organized Utopia. Better a crust and herbs with freedom than luxury without it. The tendency of government everywhere is to encroach upon the freedom of the individual man and to narrow the area of his self-expression. That, in the long run, this tendency must have a disastrous effect upon mankind and result in a serious retardation of human progress seems to me to be one of the things concerning which we may feel assured beyond any doubt. Paternalism undermines the competence of its subjects to cope with the inexorable realities of social evolution.

Our Federal and State governments tend, in constantly increasing measure, to stifle the enterprise of their citizens, and that, in my judgment, cannot fail

to retard and limit progress. Quite irrespective of the much controverted question whether government is not by its nature unfitted for the task of conducting industrial enterprises efficiently over any reasonably long period of time, there is a larger and even more serious problem to be considered, namely, the problem of the evil effects upon the body politic and social when the government, through competition with its citizens—competition that is necessarily and inevitably unfair—in the most profitable areas of economic enterprise, discourages the initiative and enterprise of those citizens either individually or collectively in voluntary groups. Precisely as a state which, like the present Soviet State of Russia, controls and directs the press, radio and other major agencies for the dissemination of information and ideas effectually checks independent thinking and so induces intellectual paralysis, so a state which controls and directs the principal economic activities of its people checks independent enterprise and thereby induces a paralysis of initiative and effort. That is the greatest evil of all.

Broadly speaking, there are three quite distinct views of government enterprise in industry. At one extreme there are the communists and socialists, whose ideal comprehends a glorification of the state. That ideal embraces a social economy based upon government ownership and operation of all industry with a corresponding state monopoly of distribution. To this group, however stoutly it may contend that state enterprise is equal to or superior to voluntary enterprise, the question of efficiency is, in the last analysis, irrelevant and inconsequential. No demonstration of the superiority of the voluntary enterprise of individuals would lessen the faith in government enterprise held by every communist and socialist. At the other extreme there are those who believe that the voluntary enterprise of citizens in their private capacity, acting either singly or in groups, because of the social relations which it entails is vastly better than government enterprise, even if and when the latter is as efficient, technically, as the best voluntary enterprise. They hold that government charged with the organization and maintenance of the economic life of the nation in addition to the historic functions of maintaining order must of necessity develop an intolerable despotism. The despotism may be benevolent in its character, a paternalistic system, or it may be severe and brutal like the system in vogue in

Russia today. No amount of benevolent paternalism can reconcile this group to government ownership and operation of any essential industry.

Between the two groups named there stands a third group, much larger than either of the others, and possibly larger than both of them combined, composed of people who are little or not at all interested in the contention of opposing principles. They are little or not at all interested in questions of philosophy. Speculations and arguments concerning the probable or possible effects of opposing principles upon the course of social evolution do not interest them to any extent that matters. They are indifferent to labels and tags, and to the abstract principles which the labels and tags connote. They are interested only in results. What they want to know is whether municipal ownership and operation of important public utilities will give them any immediate advantage, either in lowered rates or improved service. Thus we find many an industrialist, who would be horrified if it were proposed that the municipality to which he belongs should start a factory in opposition to him and drive him out of business, quite illogically and inconsistently favoring municipal ownership and operation of the rapid transit system, electric power and light service, the telephone system, and so on and so forth. However regrettable we may regard this fact, it is a fact and it is the most important and vital fact of all.

Belonging as I now do to the second group, believing fully that the highest level of social well-being and the most satisfactory rate and manner of human progress will result from what I have elsewhere called "socialized individualism," I am not especially concerned here and now with the first of the three groups under discussion. I am concerned with the last-named group, the indifferent group, which by reason of its numerical strength is politically of the greatest importance. For the sake of this discussion, then, I am willing to have the whole matter of social philosophy excluded and to confine myself to the practical utilitarian question, which gives the best results, here and now—government enterprise, municipal state or federal, as the case may be, or voluntary private enterprise subject to proper social regulation. In other words, taking our public utilities one after another and giving due and proper weight to all the available evidence, must we conclude that government enterprise gives better results than voluntary private enterprise? Does it give better service at equal cost or lower leaving a margin of advantage either of greater cheapness or superiority of service? If the answer is in the affirmative then, while personally holding and contending that the principle is wrong, I am quite ready to concede the strength of the case for government enterprise and have no quarrel with those who decide to give it their support.

It is of the utmost importance, however, that all known and pertinent facts must be taken into account and fairly and honestly evaluated. Take, for example, the application of the principle of municipal ownership and operation to electric railway transportation, the subject in which the readers of this magazine are most interested and concerning which they may be presumed to know most. It need hardly be said here that there is nothing in the business of running an electric railway which cannot be successfully carried on by a municipal government. Numerous cities, both in this country and in all parts of the world, own and operate their



John Spargo

WRITER, author and lecturer, John Spargo was born in Cornwall, England, in 1876. He was educated in the English public schools, supplementing this formal training with extension courses in Cambridge and Oxford Universities. He became interested in the socialist cause in England, and for some years after coming to this country, in 1901, he was prominently identified with that movement, but withdrew from the party in 1917. He is the author of many books, particularly on social and economic questions. For that reason his views on the disadvantages of governmental participation in industry are of special interest.

transportation systems, including both surface and subway lines. Many of these systems are operated as efficiently, on the technical side, as the best systems operated by voluntary enterprise in cities of similar size and possessing fairly comparable conditions. So much may be freely admitted. On the other hand, it is equally true that none of the innumerable surveys that has yet been made has shown the slightest balance of advantage on the side of government enterprise when the comparison with private enterprise was fairly made.

In the 40 years that this subject has held my interest and attention I have examined hundreds of reports of municipally owned transit systems in many parts of the world. I have observed the actual working of many of them and compared them with the working of privately owned and operated systems in the same countries under conditions as nearly equal as possible. Not only do I not know of a single instance in which there was a definite balance of advantage on the side of the municipally owned system, but I am quite certain that as a whole the municipally owned and operated systems

were inferior, in some important respect, to the privately owned and operated systems of the same class. Differences in the quality of service, the relative merits of technical management, do not appear in financial reports and are not easily discovered by casual observation. A comparison of systems upon this ground would require technical knowledge to which I make no pretense. It is wholly different, however, with financial management. Here the data can be evaluated and judged by one who knows nothing of the technical side of street railway operation. Paradoxically enough, however, it is precisely at this point, where lay understanding is most easily possible, that the greatest confusion and misunderstanding arises. It is the old story of the ease of manipulating statistical data.

A municipally owned local transit system is compared with a privately owned system in another city of approximately equal size and having general conditions as nearly equal as can be. Upon the face of the reports the municipal enterprise appears to be more economically operated than the other. Assuming the actual quality of the service rendered to be equal—cars quite as good, schedules quite as convenient, and all the rest of it—there is an apparent superiority to be credited to the municipal enterprise. Digging below the surface a bit one discovers that there are important items not disclosed on the face of the reports. For example, in the case of the privately owned and operated system the paving, repairing and maintenance of the street between the tracks has to be borne by the operating company, whereas in the case of the municipally owned system that heavy charge may be borne by the street department, the bills being paid by the taxpayer. Or, again, comparison of the two balance sheets reveals that the privately owned system pays a large sum in taxes to the city, while the municipal system is untaxed on the theory that it would be absurd for the municipality to levy a tax upon itself. In some cases the tax paid by the private enterprise amounts to 10 per cent of its revenue, or even more than that.

In either of the two cases cited for purposes of illustration, bringing to light the hidden factor changes the whole complexion of the comparison. Yet it is perfectly obvious that any comparison which omits such vital factors is worthless and misleading. This same factor pervades the entire problem. For example, the light and power companies of the country pay approximately 10 per cent of their income in taxes to our municipalities and states, whereas it is the universal practice to exempt municipal enterprises from taxation. Obviously, if a municipally owned plant makes a better showing than a privately owned plant fairly comparable to it, or gives service at somewhat lower rates, against that apparent superiority there should be set the fact that its exemption from taxation is in fact a subsidy which the taxpayer pays and which must be added to the apparent cost of the service in order to ascertain the true cost.

Incredible as it seems, this phase of the question is generally overlooked in popular discussion of the subject. It is the one phase of the subject upon which the propagandists favoring government ownership are uniformly silent. The "Man in the Street" is confidently regarded as being too careless to give any attention to such matters. It is not only in this country that this indirect subsidizing of government enterprise has assumed formidable proportions. It is equally true in

Great Britain and in Germany, countries which we have had held up for our emulation until we are weary. This evil practice has prevailed in Germany to such an extent that it has become one of the great scandals of German political life. In the opinion of the best economists of the country it is one of the major factors in the financial debacle. I have been profoundly impressed by a discussion of this subject from the pen of the former president of the German Reichsbank, Hjalmar Schacht, a brilliant economist noted for his constructive views.

Herr Schacht points out, in his book, "The End of Reparations," that the state and municipal enterprises of Germany "are tax exempt, while every private business is subject to taxation." He points out, also, that the state and municipal enterprises "are not required to keep public books upon business principles. Their calculation of profit and loss is not subject to adequate public control. For their own purposes they do not need it, for their credit capacity is not based upon good business management and adequate profits, but is given extensive support out of the returns from taxation which is levied to meet the expenses of the state and of municipalities."

PUBLIC DOES NOT BENEFIT FROM MUNICIPAL OWNERSHIP AND OPERATION

The idea that municipal ownership and operation of street railways, lighting systems, and other public utilities, is of immediate benefit to the consumer is wholly fallacious. It is not true of any country in the world. In those countries in which this form of municipal enterprise is most developed the immediate result to the consumer—to say nothing of probable future results to the body politic and social—is demonstrably definitely disadvantageous. Where there is a saving of dimes on bills or of cents on fares, there is an addition of dollars to the tax burden. In connection with the present economic plight of Germany it is pertinent to remember that rather more than 45 per cent of the total national income of Germany went into taxation. The entire nation is groaning under the heavy burden of an immense overgrown bureaucracy. The machinery of the state has become too cumbersome and too expensive, a result long since predicted.

We want less government participation in business, not more. We have gone much too far already in permitting government to usurp the functions and opportunities of private enterprise. We have already far too much paternalism, and the sooner we can liquidate some of it the better it will be for the nation. I make no plea for the savage and unbridled individualism of the last century, with its brutal rule of "every man for himself and the Devil take the hindmost," but I do plead for the maintenance of private initiative and enterprise in industry subject to social regulation, conceived in the fair and generous spirit of a great people striving to make equality of economic opportunity real. It is upon that socialized individualism, and not upon socialism or communism, that enduring prosperity and greatness can be built. The only communism we need, or can tolerate, is the communism of advantage that comes from equality of opportunity and is the foundation of true individualism.

This is the seventh of a series of articles by prominent men outside the electric railway industry expressing their views on transportation subjects. The eighth will appear in an early issue.



Los Angeles Rail-way garage is well equipped for the main-tenance of a fleet of 172 buses

Modernized Maintenance Facilities

Effect Improvement in Bus Performance

DURING the past decade many improvements have been made in bus design and construction, giving us the comfortable, smooth-running vehicle of today, and the problems facing the bus operator are vastly different from those of ten years ago, when repairs were continuous and failures frequent. Although maintenance problems are still with us, credit must be given to the manufacturers for making it possible for the modern bus to operate thousands of miles with no repairs or failures. In order to reap the full benefit from the improvements in the bus itself, the Los Angeles Railway has equipped its repair shop with the most modern machinery and facilities. As a result, we are able completely to overhaul a bus in a few hours, instead of spending days on a job as was customary in the past. The enormous saving in labor has more than justified the initial investment in building and facilities.

Proper light and ventilation are two essentials in bus repair shops and garages, ranking in importance with adequate repair facilities. The first question asked by our visitors is: "How do you keep it so clean?" The

By
C. B. LINDSEY
Superintendent of Automotive Equipment
Los Angeles Railway

answer is: "Don't let it get dirty." Contrary to the popular belief, mechanics do not like to grovel around in grease and dirt, and if floors are mopped daily and pits kept clean and sprinkled with fresh sawdust, the crew of mechanics will keep itself neat and there will be no complaints of grease on the upholstery of the vehicle.

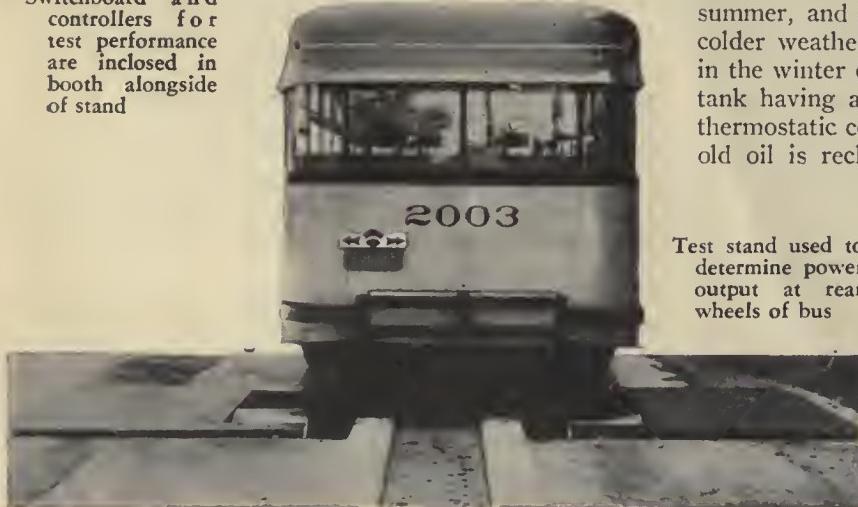
Cleaning buses is one of the most expensive items of maintenance and one of the most essential. As each bus is stored for the day the interior is cleaned by using 100-lb. air pressure from conveniently located hose connections. The windows are then cleaned, and the seats and windowsills dusted. Those buses not deemed clean enough for service are given a thorough washing with a high-pressure spray and warm water from a water

softener. All grease spots are removed with a sponge and soap and water. The tops are cleaned with a long-handled water brush by a man standing on a suspended platform. The use of the water softener has proved very satisfactory and has made it unnecessary to use special soaps and solutions, which we have found tend to shorten the life of paint. Water for filling bus radiators is also obtained from the water-softening machine and has been found to reduce scale.

All buses are serviced with gasoline and oil immediately on entering the storage yard. A remote control system, metered to $\frac{1}{16}$ gal., is used for dispensing the gasoline. At present we are using approximately 5,000 gal. of gasoline per day. Many of our



Switchboard and controllers for test performance are inclosed in booth alongside of stand



Test stand used to determine power output at rear wheels of bus



All buses are serviced with gasoline and oil immediately upon entering the storage yard

Individual kits encourage the mechanics to take good care of their tools



Plug board used by the dispatcher in assigning buses for the day's run

buses are equipped with large filling spouts to reduce the time of gassing. The small inlet is being discarded rapidly.

A high-grade paraffin base lubricating oil with a viscosity of 140 Saybolt at 210 deg. is used during the summer, and an oil of 120 Saybolt at 210 deg. during colder weather. To facilitate the handling of heavy oil in the winter each oil dispenser is equipped with a single tank having a standard electric heating element with a thermostatic control. Oil is changed at 2,500 miles. The old oil is reclaimed by contract, approximately 85 per cent being returned. Samples of the reclaimed oil are taken from each shipment and tested. For this work a special machine has been designed by our engineering department. It consists of a rotating shaft immersed in the test oil, which is heated, with calibrated weights placed evenly on the two bearings. When the load limit is reached, the circuit breaker is thrown and the shaft stops rotating. The test factors obtained with this apparatus



Cranes are employed to raise the rear end of a bus undergoing repairs

are taken into consideration in the purchase of oil.

Two traveling cranes of 5-ton capacity have almost completely replaced the jack and a hand-operated lift for the removal of transmissions and differential assemblies, and have paid big returns in eliminating accidents and damage to equipment.

Even when a fleet of buses consists of several types a great deal of delay will be avoided by carrying an adequate number of spare parts. In this manner, the unit requiring repairs can be replaced by a spare unit, without holding up the vehicle. The unit can then be repaired by an expert mechanic and thoroughly tested before being replaced in service. A tag system has been devised to check mileage and cost of repairs on each unit. This information is essential to economical maintenance of large fleets, as considerable difference will be found in the mileage obtained from the various parts of different types of buses. Moreover, the cost of replacement cannot be obtained without accurate mileage data.

This company has adopted the tire mileage contract plan, as have many other bus operators. We feel that this is the most satisfactory way of equipping buses with tires. Damage to tires from accidents, misalignment, etc., is paid for by the operator. Punctures, glass cuts, etc., are accepted by the tire company as road hazards.

When an engine becomes noisy and the consumption of fuel and oil increases noticeably, it is completely dismantled. The crankcase and other parts are thoroughly cleaned in a solution tank, and, if necessary, new main bearings are installed and line-reamed, the cylinder block and pistons are renewed and the valves refaced. The engine is then "run in" for several hours, using ordinary lighting gas as fuel, before it is ready for service.

Great care is taken in setting up new main bearings. The apparatus used for this purpose was made in our own shops and can be used with all types of our engines. By the use of new bearing metals we have been able to

increase our mileage on some buses to more than 100,000 before replacing the main bearings.

Our experience has been that the frequent stops in city service rapidly heat up brake drums and cause distortion and trouble. With the exception of a few light units all our buses are equipped with air brakes. Heavy cast-iron drums, well ribbed and ventilated, are used. Brake blocks have eliminated lining trouble, and a bus can now be relined and returned to service in a few hours. Recently we have been able to obtain oversize brake blocks for use with worn drums. These blocks can be removed when the limit of cam travel has been reached, and are used again on new drums. A machine has been developed for trimming brake blocks that undergo a change in radius. It resembles a hub and is mounted on the axle housing or shaft, and is driven by the bus engine. By the use of a cross feed and a star wheel, the cutter neatly trims the blocks to a proper radius in a few minutes. Buses relined in this manner can be put in service at once without "burning in." This practice avoids injuries to the wheel bearings, tires, clutches and the brakes themselves. Air compressors have been greatly improved by the addition of the unloader head and by replacing the old style poppet valves with disk valves. Special compressor oil has been found necessary on these small compressors in order to eliminate trouble from plugged lines. After compressors have been overhauled they are coupled to a variable speed motor and "run in." They are then connected to an air tank and tested before being returned to service.

Defective carburetion and gas fumes have been the source of much trouble. After having tried a number of measures without result, the addition of a valve in the intake manifold was found satisfactory in reducing the gas fumes. When the valve is used it is necessary for the operator to leave the clutch engaged as long as possible when slowing down, because the valve operates at maximum efficiency when the vacuum in the intake mani-



Tops are washed from a suspended platform with a long-handled water brush

fold is high. Proper carburetion with present-day fuels is a difficult problem. It is necessary to assist vaporization by heating the manifold riser, yet heat in the carburetor bowl or gas line will result in vapor lock. It has been found desirable to have all carburetor repairs and adjustments made by one mechanic. If this mechanic is not available when trouble occurs, the entire carburetor is changed. This practice has resulted in increased fuel mileage and has been found much more satisfactory than the indiscriminate adjustments by the average mechanic. In our fleet there are buses equipped with vacuum tanks, auto pumps or fuel pumps. Up to the present the fuel pump has been found the most satisfactory.

Heavy-duty generators with voltage regulators have done much to reduce failures of the electrical system. We build and repair all of our storage batteries, and where possible have standardized on batteries of two 6-volt cells in series rather than the conventional 12-volt type. These are easier to handle and less costly. Headlights are kept in good condition and focused according to state regulations by an outside contractor who checks them at frequent intervals.

All pull-ins are given a careful safety inspection. All parts of the bus are checked, and any defects noted are indicated on a report card. These cards are collected by the foreman in charge, who assigns the necessary work to the repair men. It has been found desirable to have the repair men specialize on certain types of buses, as the grade of their work rises as they become more familiar with it.

Each mechanic is furnished a complete kit of tools. These are periodically inspected, and any tool lost must be replaced by the mechanic at his own expense. If a hand tool is worn, a new one is furnished by the company. Electric drills, gear pullers, heavy socket wrenches and other heavy tools are available to the mechanics upon presenting a check at the tool room. Machine work is often done at the shop when necessary, although heavy forgings and quantity manufacturing are done at the car shops. All painting, body repairs, and upholstery are also done at the car shops, where more than 1,200 cars are maintained. Overhaul and painting of bus bodies are scheduled on a 24-month basis.

A chassis dynamometer designed and built in our own shops is used as a proving stand. It has been found valuable in determining the actual power output at the rear wheels of buses. Two street car motors equipped with large pulleys and suspended beneath movable iron platforms, which are air controlled, are brought into position. The rear axle is then chained securely to a saddle, also movable and air controlled, and locked in position so that the center of the tires will be exactly on the center of the pulleys. If the bus is to be checked for friction loss or unusual noise in the drive shaft or the body, current is fed to the motors through controllers until sufficient speed has been reached. If on the other hand, the bus is to be tested for power output, the engine is started, opening the throttle gradually until full speed is reached. The motors then become generators and the power output is measured. Test curves have been drawn for all buses when in good running condition so that any loss of power can be detected immediately.

Small generators connected to electric indicators are very useful in checking speedometers. Engines on Twin Coaches can be synchronized accurately in a few moments. Many other instruments are located in the control room. A telephone, with headset, enables the tester

to talk with the mechanic operating the bus. Thermocouples are frequently attached to the various units suspected of excess friction loss and are also used to keep radiators at normal temperatures. To accomplish this, an airplane propeller, motor driven, is mounted on a movable pedestal and a cool breeze directed at the radiator whenever necessary.

Buses are assigned to operators for runs from the garage. The buses are started by mechanics whose duty it is to see that the hood is fastened down and everything ready. The dispatcher who assigns the buses to the runs is assisted in this work by a plug board which has proved very convenient in keeping a close check on all buses. Each plug represents a bus, and as the board is made up for the day the plug is inserted in the board opposite the line and run number. Buses with large gas tanks are assigned to the longer runs.

Road service trucks, fully equipped with spark plugs, light bulbs, tires and tools for making repairs, are located at points near a telephone. The mechanics in charge of these trucks are selected for their expert knowledge in locating trouble. If a driver calls the garage from his run reporting some mechanical defect, the clerk will locate a road service man and direct him to the bus. If a change is necessary, a new bus is despatched from the garage. This work calls for expert knowledge of equipment, location of lines, distance from service truck locations and garage, and many other details. It is not uncommon for our entire fleet to operate through the day with no lost time. This, of course, is largely due to the many mechanical improvements, but credit is due to the dispatcher who can tell the operator reporting the trouble what to do in order to keep it running until the service truck reaches him. Although a number of our own buses have approached the 300,000-mile mark, they are still operating and giving satisfactory service on suburban runs.

Delay in returning buses to service from the repair shops can only be prevented by keeping an adequate supply of parts and materials available. Where several different types of buses are used this involves a considerable outlay, as very few parts are interchangeable. Parts and materials are purchased on a 90-day basis, the previous 90-day consumption being the determining factor when ordering, unless there has been notification of expected increases by the mechanical department. Although more than 7,000 items are carried in stock, representing an investment of more than \$45,000, it was found during a recent inventory that less than \$90 worth of parts and materials are requisitioned from the store-room by the foreman or his clerk. In most cases discarded parts must be turned in before new ones are issued. If the requisition cannot be filled and the part is needed, an emergency requisition is written by the general foreman and a pick-up man sent to the nearest service station.

Conveniently located above the machine shop is the garage office, where the workman's time and mileage records are kept. These are instantly available to foremen for reference. Numbers of the buses due for greasing or oil changing are posted daily. Records of miles per gallon of gasoline and oil are kept on individual buses and a monthly report is issued for the benefit of foreman and mechanical men. Mechanical unit, tire and body records are posted daily and used in determining the mechanical life of each. Miles per equipment failure is classified by types and units.

MIDWEST ASSOCIATIONS

Have Profitable Convention at Denver

Merchandising, employee relations, traffic and trolley buses among subjects discussed. Claims Association and Equipment Section met with general association in major sessions and also held separate meetings

ASSURANCE of a continued satisfactory life of service for those electric railways that will further modernize their properties, merchandise their facilities and win public approval and sympathy was the optimistic keynote which pervaded all discussions at the joint convention of the Midwest Electric Railway Association and the Midwest Claim Agents' Association in Denver on July 16, 17 and 18, 1931. Statistical analyses of many important problems were presented by the scheduled speakers, and the open periods which followed them were valuable because of the participation by representatives from practically every member company. In the separate meetings of the claims association and the equipment section, questionnaires sent out in advance were answered in detail by every member property, resulting in the development of valuable data on many current problems confronting the various claim agents and master mechanics.

President C. A. Semrad opened the first general session on Thursday morning by asking H. S. Robertson, president Denver Tramway, to introduce Mayor George D. Begole. The Mayor welcomed the convention to Denver, complimented the Denver Tramway Corporation on its past accomplishments, and assured the officers of the support of his administration in their future efforts. Mr. Semrad responded to the Mayor's welcome and emphasized the necessity on the part of all railway properties to secure the co-operation of public officials and the molding of public opinion. "The public still visualizes the railways as a monopoly in city transportation," said Mr. Semrad, "as having special privileges and concessions, knowing nothing of our taxes, franchises and imposts which benefit competitive transportation facilities. We must change the public's belief that street railways are becoming obsolete and decadent, and by modernization and merchandising must equip ourselves to give the best type of service and then to sell it to the public."

Charles Gordon, managing director American Electric Railway Association, in discussing what mass transportation means to a city, outlined the trend in social and business activities over the past century and characterized the part transportation has played in the development of our

cities. He stated that no city planning is now done without a basic study of transportation and the economic efficiency of its various agencies. "In the development of these agencies," said Mr. Gordon, "lies the only hope for economic use of city streets." Substantiating his claim, Mr. Gordon quoted statistics from cities having a population greater than 250,000, showing that, on an average, approximately two-thirds of the population are still dependent on mass transportation facilities. He also quoted figures showing the relative efficiency of the various vehicles using the streets from the standpoint of street occupancy and of passenger carrying capacity.

In discussing the small city problem, Mr. Gordon urged a careful study to determine whether the city will support any transportation system. "In the past," said Mr. Gordon, "too many operating companies considered only two factors of responsibility, namely, the car rider and the stockholder. However, there is a third factor, the property owner, who is vitally affected by transportation services. The mass transportation agency is not only responsible to the property owner, but the property owner also has a responsibility in maintaining an adequate transportation system."

An interesting paper on the psychology of employee relations was presented by F. G. Buffe, vice-president in charge of operations, Kansas City Public Service Company. He traced the development of employee relations through the four preliminary stages. He classified them as the Hire-and-Fire Period, the Paternalistic Era, the Efficiency Era and finally the Industrial Psychology Period. Mr. Buffe then explained in detail the various participation and benefit plans which have been put into effect on the Kansas City property since 1919, dealing especially with the latest or participation plan. He quoted figures on the results of this plan for the first six months that it has been in operation and stated emphatically that its success, in all phases of operation, was beyond all measure of that anticipated by the officials of the company. A detailed discussion of this subject by Mr. Buffe was published in the June issue of ELECTRIC RAILWAY JOURNAL.

Following the Thursday morning general session, three round-table luncheons were held which carried on



Electric railway men of the Midwest with their families

as separate meetings of the Equipment Section, Claims Association and an executive meeting of the general association. Robert P. Woods, receiver of the Kansas City, Clay County & St. Joseph Railway, presided over the general session and directed open discussion on the kind and character of service, co-ordination of rail and bus services, fares, types of equipment, economies of operation, public and employee relations, legislation and taxation, advertising and freight.

LUNCHEON MEETING OF EQUIPMENT GROUP

The equipment group luncheon was the first annual session of this section. R. W. Bailey, engineer of power and equipment, Kansas City Public Service Company, was chairman of the meeting and submitted comparative costs of maintenance of the member companies of the Midwest Electric Railway Association. The comparative tables submitted in this report included: Costs on bus operation, including fuel and lubrication; costs of street car operation, including maintenance, cleaning and inspection; average miles per bus failure and average miles per car failure. Additional statistics were presented which compared car failure records of 38 railways, showing miles per failure chargeable to maintenance and miles per failure chargeable to operation. In addition to comparing costs chargeable only to maintenance, the Midwest Equipment Section includes in its comparisons the total expenses for which maintenance departments are responsible, namely, those items directly chargeable to maintenance plus inspection and car cleaning which are chargeable to operation. Comparisons on this basis were submitted from more than 30 companies throughout the United States. The remainder of the meeting was devoted to the discussion of a questionnaire which had previously been compiled and sent to member companies and which brought forth discussion on car lighting, flooring, lubricated trolley wire, testing overhauled motors, results in bus operation, noise reduction and many other equipment subjects.

CLAIMS SUBJECTS DISCUSSED

Under President M. B. Bracken, general claim agent St. Louis Public Service Company, the Midwest Claim Agents' Association held two important separate sessions. Their discussions were divided under two topics—"Standardization of Claims Statistics" and "Claims Policies." Charles L. Carr, general solicitor Kansas City Public Service Company, presented a paper on the first topic in explanation of a standard form for the compiling of claim statistics, which he submitted for the association's consideration. The form submitted consists of

seven main subdivisions, namely: Operating statistics, accidents, claims, lawsuits, trials, expenditures, and I&D statistics, compared and equalized. After a thorough discussion of the form itself, Mr. Carr stated: "In summing up, it is our opinion that the percentage of total I&D expenditures to passenger revenue should not be used as a basis for comparing I&D statistics; that as between companies the preferable basis to be used is the I&D cost per passenger per mile, and particularly on equalized figures as shown on the form; that as between departments of various companies handling I&D matters a preferable basis of comparison is the average total cost per public accident equalized with regard to lawsuits as explained in the form." The form was thoroughly considered by the claim agents present at the meeting and suggestions were made for minor changes which will result in a form being submitted to the industry as a first step to a more perfect standardization of injury and damage statistics.

Under the subject of claim policies, a questionnaire on various phases of policy was discussed relating to the attitude of claim agents to law associations, medical fraternities, collections, affidavits, adjustments, potential claimants, witnesses, hospital bills, co-operation of newspapers, secret service, and the like.

On Friday the two general sessions dealt principally with merchandising and traffic problems and the trolley bus. Laurence Wingerter, Des Moines Railway, in discussing merchandising and advertising transportation described the practices of his company in selling its transportation service. He compared the street railway business and its competition with other industries and like competition, showing how effective merchandising and advertising could produce profits. He emphasized four distinct advantages which the street railway's product—street car transportation—holds over its competing product—private automobile transportation. He urged that these advantages be frequently presented to the public in advertising. They are: first, that street cars provide the safest form of transportation on the city streets; second, they are the most economical of all forms of transportation; third, in all cities, they are the most convenient means of getting to and from the congested district, and fourth, street cars offer comfort and absolute freedom from the worry and strain of driving an automobile in heavy traffic. He suggested as means for keeping these advantages before the public, the use of exterior and interior car cards, personal visits to newcomers to a city, newspaper advertising, theater advertising, maps, booklets, direct mail letters and time-tables.

F. C. Lynch, director of the Kansas City Safety Council, in discussing street traffic problems, pointed out



and friends attending the recent convention at Denver

that from the standpoint of the operator of mass transportation units, street traffic problems largely consisted of increasing speed, reducing accidents and selling service. He emphasized two points. First, co-operation with city and traffic officials in increasing the efficiency of streets by proper operation and not asking for too much in the way of no-parking regulations where such restriction would not benefit street car or private vehicle use of the street. Secondly, he urged the proper training of personnel on cars and buses to assure efficient operation and freedom from accidents. Mr. Lynch believes that one of the most important phases of railway operation is in the study and training of men so that they may be mentally equipped to handle their jobs and to have the respect of other users of the street. His plea above everything else was for a little more courtesy and tolerance on the street between the operators of the different classes of vehicles.

I. E. Cox, transportation engineering department, General Electric Company, St. Louis, presented a paper on field tap control by the use of resistors and its effect upon speed and motors. He discussed the method of reducing field flux of railway motors during the past years and showed the advantage of reduced field over reduced gear ratio to obtain higher free running speed by effecting a saving of energy and the reduction of heating in the motors. "The amount of field reduction," said Mr. Cox, "is approximately 40 per cent, which results in about 20 per cent increase in free running speed. The greatest gain in schedule speeds is realized on routes with a considerable portion of free running, but some gain, amounting to 3 or 4 per cent in schedule, is obtained in service where the stops per mile average seven or eight." Mr. Cox discussed in a technical manner the application of field reduction on new equipment and the more careful application necessary in applying field reduction to existing cars and older equipment.

INTEREST SHOWN IN TROLLEY BUS

Discussion of the trolley bus, which took up the afternoon session, was led by Charles O. Guernsey, chief automotive engineer J. G. Brill Company, Philadelphia, Pa., whose paper appears in abstract elsewhere in this issue. E. A. West, general manager Utah Light & Traction Company, Salt Lake City, discussed operating features and problems of trolley buses by describing the service in Salt Lake City and the problems which have arisen and been solved on his property. He discussed operating and maintenance costs under the headings of way and structures, overhead equipment, conducting transportation, and power, and pointed out specific instances where maintenance costs were higher or lower. Mr. West answered many questions from representatives

about the operation of trolley buses in Salt Lake City, which evidenced much interest in this vehicle by Midwest transportation men.

At the general luncheon on Friday, J. N. Shannahan, president Omaha & Council Bluffs Street Railway, presided. The subject which he introduced was the desirability of encouraging younger men, preferably college graduate engineers, to enter the electric railway industry. He stated that one of the greatest problems confronting the railways today is the necessity for bringing new and younger talent into the business to carry on in years to come. He suggested the appointment of a committee to study this subject and called upon various members in the meeting to present their views. Opinions were unanimous for the desirability of bringing young men into the transportation industries, and many advantages and inducements were suggested which might be used to encourage college courses in transportation engineering.

NEW OFFICERS ELECTED

Officers elected for the coming year for the Midwest Electric Railway Association were as follows: President, Robert P. Woods, receiver, Kansas City, Clay County & St. Joseph Railway; first vice-president, C. W. Gifford, general manager Des Moines Railway; second vice-president, C. D. Porter, vice-president and general manager Omaha & Council Bluffs Street Railway; secretary-treasurer, J. A. Weimer, superintendent of transportation Kansas City, Clay County & St. Joseph Railway.

Officers elected for the Claim Agents' Association were: President, Von L. Baker, claim agent St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.; first vice-president, C. R. Bennett, general counsel Des Moines Railway; second vice-president, W. P. Thomas, claim agent Omaha & Council Bluffs Street Railway; secretary-treasurer, Charles E. Sharkey, claim department St. Louis Public Service Company, St. Louis, Mo.

The entertainment part of the convention was effectively carried out under the direction of James L. Adams, superintendent of transportation Denver Tramway. The ladies were entertained daily, and each evening a special feature was provided for all the delegates in Denver. On Thursday evening a theater party and dancing were arranged for at Elitch's Garden, and on Friday night a general reception, banquet and dance was held at the Lakewood Country Club. The Hon. Benjamin C. Hilliard, Justice of the Supreme Court, State of Colorado, was the guest speaker on Friday evening. On Saturday morning trips into the mountains were arranged and delegates and their families could choose any one of five trips, ranging from 50 to 250 miles.

WHO SHOULD PAY

for *High-Speed Transit?*

EDITOR'S NOTE—More than 25 years' experience in the real estate business in Philadelphia has given Horace Groskin an intimate knowledge of land values. As chairman of the Transit Tax Commission appointed by the Mayor of Philadelphia in 1928, he had an unexcelled opportunity to study the effect of rapid transit on real estate values. In this article he emphasizes the fundamental fairness of the benefit assessment method of financing, supporting his argument with many pertinent facts and figures.

\$437,000,000, a sum of money greater than the entire cost of building the Panama Canal, was paid out in 1926 and 1927, by property owners in cities of more than 30,000 population, in special assessments for street paving, street widenings, street openings, sewers, water pipe and many other types of local improvements, that were directly beneficial to the properties in the district of the improvement. A sum even greater than the amount paid out in special assessments has also been spent for another type of improvement, the construction of rapid transit railways, such as elevated and subways, without special assessments being made against the property owner, although this type of improvement has had an even greater beneficial effect on property values, than some of the other improvements already mentioned.

In a number of the big cities throughout the country a large part of the burden of paying for these elevated and subway lines now rests on the back of the general taxpayer, although the great majority of the taxpayers of the community receive only an indirect benefit, while certain particular property owners in the elevated or subway territory receive enormous special benefits through securing greatly increased property values.

Modern cities must have high-speed transportation to develop their outlying territory and to maintain rentals and property values in built-up sections, as well as to relieve congestion in their central business districts. Transportation companies have been unable to secure the capital required to build expensive subways or other high-speed railways, making it necessary for municipalities to construct these lines by raising the money on their credit, and paying a large part of the cost and carrying charges out of the funds supplied by the general taxpayer.

This situation is now raising these important questions: "How long can the larger cities of the country continue this policy of municipal construction, in view of the fact that many of them have already reached the limit of their borrowing capacity, and in view of the further fact that the burden on the general taxpayers has almost reached the breaking point?" "How much longer can the cities of the country continue to use credit for rapid transit construction and fail to meet their other obligations to

make other improvements which are also vital and necessary to the progress of the community?"

There is only one logical answer: The time is rapidly approaching when all cities desiring to build rapid transit lines must either adopt the policy of special assessments for a portion of the cost, or they will be compelled to stop building these lines, for the reason that they will no longer have the necessary credit to use for this purpose, and for the additional reason that the general taxpayer will no longer be able to carry the load.

By adopting the plan of special assessments for special benefits, the municipalities will not only have the opportunity to apportion the cost and carrying charges of the high-speed railway construction between the general taxpayer, the car-rider and those property owners who receive special benefits from the railway, but they will also have the opportunity to increase the amount of high-speed construction which is so absolutely necessary in all the larger cities throughout the country.

A high-speed rapid transit railway produces a direct special benefit to property owners in the high-speed territory, as well as a general benefit to the community as a whole. The general benefit, however, is remote and incidental, while the local benefit is special and direct.

One of the general benefits received by the community as a whole from a rapid transit railway results from the fact that the high-speed line being in existence gives everyone in the community an opportunity to use an additional means of rapid transportation in a particular section. If such a line were not available, it would mean that thousands of people would be compelled to use other means of transportation, such as automobiles, taxis, buses, etc., resulting in increased traffic congestion, additional wear and tear of the highways, and added expense to the general taxpayer. Another general benefit from a high-speed line received by the community, as a whole, is due to the great amount of time saved by its people, which not only benefits actual riders on the rapid transit line, but benefits thousands of other people whose interests are joined with the users of the line, so that the benefit is spread to a large part of the community, making it of city-wide importance and, therefore, a general benefit.

Still another general benefit received by the entire community from the rapid transit railway is the increased revenue secured by the municipality by reason of the higher real estate values created by the rapid transit railway, which adds income, as well as increased borrowing capacity, making it possible to enlarge the program for other improvements in other sections of the city.

Should the Taxpayers Alone Pay the Cost, or Should the Owners of Benefited Property Contribute Their Share?

By

HORACE GROSKIN

Realtor
Philadelphia, Pa.



Crowds using 69th Street Terminal in Philadelphia reflect growth of population in that area since inauguration of rapid transit service

These general benefits, however, are incidental, remote and limited, when contrasted with the direct special local benefits secured by certain particular property owners in the rapid transit area. The direct special local benefit resulting from a high-speed railway is due to the fact that it promotes greater accessibility to and from the district in which it is located, stimulates the riding habit, helps to maintain the established advantages of the section, and either stabilizes or increases real estate values within the sphere of its influence.

Many people who have not investigated this subject seem to be under the impression that a rapid transit railway is mainly beneficial to land in outlying sections, and at station and terminal points; but, as a matter of fact, the benefits are also very great to property owners in the built-up sections of a community. The benefit received by property owners in built-up sections does not always result in increased real estate values, but it does result in retaining and stabilizing real estate values, and, in many sections, it helps to hold up rentals, as well as property values, where they would decline if they did not have the advantage of a rapid transit railway.

EFFECT OF RAPID TRANSIT ON LAND VALUES IN PHILADELPHIA

We have an illustration of the influence of a rapid transit railway in preventing a great loss in real estate values in the experience of the old central business district in Philadelphia. About 30 to 35 years ago, the main business center was located in the east part of the city, in the neighborhood of Eighth, Arch, Market, and Chestnut Streets. The city's trend of development was north and west, and the business district in the eastern section began to move toward the west. In 1907, the Market Street Subway-Elevated began operation through the old business center, and every real estate man acquainted with this district knows that the bottom would have dropped out of the real estate values in this old business section if it had not been for the operation of this high-speed line.

What actually happened was that during a twenty-year period between 1907 and 1927, there was an increase in assessments of 94 per cent in the Sixth and Ninth Wards,

wherein the old business district is located, as compared with an increase of 141 per cent throughout the entire city. This shows how well values in the old section were maintained, despite the tendency of business to move westward. While it is true that there were some declines in certain particular properties in this area, yet whatever declines took place were very gradual, and very much retarded, whereas, if no subway had been built, there can be no question but that the existing real estate values would have melted away rapidly all over the entire district.

Residential sections as well as business sections also receive a direct special benefit from a high-speed line. A rapid transit railway generally stabilizes a residential district, so that rentals, as well as real estate values are held up, whereas, they might recede if the line were not there. A subway or an elevated helps a section to meet the competition of other sections, especially when the trend of development is in another direction.

In a business district, a rapid transit railway often retards the outward spread of its business section to adjacent or other outside areas, and concentrates building development within its own area, bringing into demand the vacant or unimproved property and stimulating the potential possibilities of increased real estate values. A high-speed line also promotes the improvement of underdeveloped property in a business district, and creates an opportunity for the fully improved property to be used to its maximum capacity and usefulness.

A subway or an elevated relieves a certain amount of street traffic congestion which is particularly beneficial in central business districts where accessibility is restricted and where real estate values often remain dormant, or begin to sag on account of the restricted accessibility. All of these benefits are direct special local benefits secured in the territory within the sphere of influence of the high-speed line.

The relief of a certain amount of congestion in a subway area, is, in itself, a very important special benefit. As an example of the effect of high-speed lines on street traffic congestion, the experience of the Philadelphia Rapid Transit Company is interesting. The company has established several automobile parking spaces at three of its outside high-speed terminals. It offers a parking space for an automobile and a round-trip ticket on the elevated or subway for 25 cents; 10 cents for the parking

space and 15 cents for the round-trip fare. During the year 1930, more than 43,000 cars parked in the space provided by the company at the northern terminal of the Broad Street Subway; 90,000 cars parked at the Bridge Street terminal of the Frankford Elevated, and 141,000 cars parked at the 69th Street terminal of the Market Street Subway-Elevated. In other words, 274,000 cars were parked in the spaces provided by the company as well as tens of thousands of others parked elsewhere around the terminals.

Is it not fair to assume that had there been no subway or elevated available, a very large percentage of these 274,000 automobiles—enough cars to make a continuous row between Philadelphia and Detroit—would have been taken into the high-speed area and very materially increased street traffic congestion? This relief from a certain amount of street traffic congestion is, without question, a special local benefit to properties in the area served by rapid transit.

These direct special local benefits from a high-speed railway are important major benefits to property owners in a high-speed area, and are superior to the general indirect benefits to the community as a whole.

RAPID TRANSIT IS PRIMARILY A LOCAL IMPROVEMENT

A subway or an elevated is not a metropolitan improvement, such as a main through highway, or a great bridge or tunnel connecting states or cities, or large shipping docks that improve port facilities, or an extensive park system, that is available to the entire population. These municipal improvements of metropolitan importance produce a general benefit in a major degree to the community as a whole, although they also produce a certain amount of special local benefit, but the principal benefit of the metropolitan improvement is general to the entire city, while the principal benefit from a subway or other high-speed lines is local to a particular section.

One of the most convincing demonstrations that the benefit from an elevated or a subway is not general to the entire city, but is a direct special local benefit, is the fact that its very existence sometimes proves detrimental to other sections of a city which are not within the sphere of its influence. Some of these adjacent or outside districts are in direct competition with the elevated or subway territory, and, by reason of the high-speed territory having greater accessibility, the adjacent district suffers from a decrease in the normal demand for its location, and has its trade and other activities retarded, so that its rentals from real estate begin to recede and its real estate values either remain dormant or decline.

In fact, real estate values are often practically extracted from adjacent territory and carried to the rapid transit area, where general activity and trade is accelerated and rentals and real estate values are increased at the expense of the adjacent territory. The demand for property naturally gravitates towards the rapid transit area.

The experience in Philadelphia with the West Philadelphia Subway-Elevated illustrates this fact. Back in 1900, the trend of building development was moving in a northerly direction where the city had thousands of acres of undeveloped land. When the new high-speed line in West Philadelphia was put into operation in 1907, it began to take away thousands of people from other sections. This benefited West Philadelphia, but was

injurious and detrimental to other districts. According to the statement of the transit department, during the first ten years of the operation of the West Philadelphia Subway-Elevated, the passengers carried on the line increased from 26,395,000 the first year, to 74,570,000 the tenth year, or an increase of about 182 per cent.

When the construction of the new Market Street Subway-Elevated started in the western part of the city, builders from the northern section bought land in the new high-speed territory, so that, when the new line began operation in 1907, there was a concentration of building in that part of the city, with a very definite check to the development of the north and northeast sections.

According to the records of the Bureau of Building Inspection in Philadelphia, during the first ten years of operation of the high-speed line in West Philadelphia, from 1907 to 1917, there were 22,884 dwelling houses built in the 34th, 40th, and 46th Wards, comprising the principal undeveloped districts of West Philadelphia, while during the same ten-year period, there were only 14,096 houses built in the 22nd and 42nd Wards, comprising the principal district of North Philadelphia, although the northern wards contained almost 30 per cent more land than the West Philadelphia wards. In other words, the West Philadelphia wards, with about a third less acreage, built 62 per cent more houses than the North Philadelphia wards because it had a high-speed line.

In 1912, five years after the Subway-Elevated began operation in West Philadelphia, land and buildings in the 34th Ward of West Philadelphia had a value for taxation purposes of \$18,813 per acre, while land and buildings in the 42nd Ward of North Philadelphia had a value of \$5,996 per acre—only 32 per cent of the West Philadelphia figure. Land and buildings in the 46th Ward of West Philadelphia had a value for taxation of \$31,969 per acre, while land and buildings in the 22d Ward of North Philadelphia had a value of \$12,471 per acre—about 40 per cent of the West Philadelphia value. It can be readily seen from the city records of the assessment and building permit bureaus that land in the northern section of the city had suffered a reduction in demand, and, consequently, did not secure the increase in building construction and land values it would have received had there been no West Philadelphia high-speed line competition.

SIMILAR GROWTH FOLLOWED BUILDING OF FRANKFORD ELEVATED

When a new high-speed line was built and began operating in the Northeast section of the city in 1922, a tremendous building development started in that section, which almost equaled the development in West Philadelphia. According to figures from the Bureau of Building Inspection, from 1914 to 1922, the eight-year period prior to the opening of the Frankford Elevated, there were 2,912 houses built in the 23rd, 41st, and 35th Wards, comprising the principal wards in the northeast section of the city, while during the eight-year period following the opening of the rapid transit line, from 1922 to 1930, there were 21,078 houses built in these same wards. In other words, the number of dwellings built during the eight-year period after the beginning of operation of the high-speed line was more than 600 per cent greater than the number of houses built during the eight-year period prior to the operation of that line. While, of course, this tremendous gain in building con-

struction happened to coincide with the period of general prosperity and building activity throughout the entire country, and must, therefore, be discounted to some extent, yet it is evident that the northeast section had the potential possibilities for building development, and would have been built up years ago if it had not been for the high-speed competition of West Philadelphia.

The general benefit, therefore, derived by the entire city from the West Philadelphia Subway-Elevated was limited, while the benefit secured by the property owners in the high-speed territory was a major benefit, special and direct.

The special direct local benefit resulting from the West Philadelphia Subway-Elevated is clearly illustrated, by the experience of property owners in the 69th Street terminal area. In a territory comprising about 7 square miles surrounding this terminal, the population in 1910 was 5,385 people, but by 1929, this had increased to 65,000 people. Real estate assessments in this territory totaled \$4,725,210 in 1910, but by 1929 they had grown to \$48,369,490, an increase of more than 900 per cent. This shows that the entire district had derived a gigantic special direct benefit from the operation of the high-speed line.

INDIVIDUAL PROPERTY OWNERS PROFIT BY SHARP INCREASES IN LAND VALUES

As an example of the direct local benefits to some of the individual property owners in this territory, and as an illustration of what occurred in the way of local benefit to hundreds of other property owners in this district, I would direct attention to a sale made of a 17½-acre tract of land in this section, which was originally purchased by Howard Sellers in 1908 for \$100,000, about a year after the West Philadelphia Subway-Elevated started operation, and sold in 1928 for \$1,000,000, showing an increase from about \$5,700 per acre to about \$57,000 an acre. Another 18-acre tract of land in this territory, along Cobbs' Creek, belonging to Wolfenden Shore & Company and Cardington Land Company was sold to the city of Philadelphia in 1928 for \$1,000,000, or at the rate of about \$55,000 per acre. This same high percentage of increase in value has been duplicated in hundreds and thousands of instances all over the country, where high-speed lines have been put into operation.

The direct special benefit received by the property owners is also illustrated in the northeast section resulting from the Frankford Elevated. The figures of the Board of Revision of Taxes show that in 1922, when the Frankford Elevated began operation, the three principal wards, the 23rd, 35th and 41st, had a total assessed valuation of \$70,829,930, and in 1931, nine years after the Frankford Elevated had been in operation, the total valuation had increased to \$230,580,425, or an increase of \$159,750,495. During this period of nine years, the assessments of real estate throughout the entire city had increased 60 per cent, while the percentage of increase in the three northeast wards was 225 per cent.

One of the most interesting disclosures of special local benefit to property owners resulting from a subway was made in a report in Philadelphia, in the year of 1928. The Mayor of Philadelphia, desiring to know the effect of the new Broad Street Subway on real estate assessments, real estate values, and the amount of tax return on the increased values to the city, appointed a commission of four real estate men to make an investigation and report. This commission, of which the writer was chairman, divided the Broad Street Subway route into

sixteen zones of four blocks each, and made a separate investigation in each zone. The commission found that during the fourteen-year period of projection and construction from 1914 to 1928, real estate assessments in the entire area influenced by the subway had increased from \$445,638,629 in 1914, to \$815,893,296 in 1927 a gain of \$370,254,667, and out of this total gain, more than \$68,000,000 in assessments were due to the direct influence of the Broad Street Subway. The commission reported that during the fourteen-year period, the city had collected \$14,617,204 in additional taxes resulting from the increased values created by the subway, and that the property owners had received increased real estate values amounting to \$134,000,000, or about \$15,000,000 more than the entire cost of the subway.

The city of Philadelphia had spent about \$120,000,000 on the subway, and the specially benefited property owners in the subway area received \$134,000,000 of increased property values, so if we deduct the \$14,000,000 paid by the benefited property owners in additional taxes from the \$134,000,000 of increased values, the benefited property owners still gained \$120,000,000 at almost the entire expense of the general taxpayer. The general taxpayer is now paying practically the entire cost, and carrying charges on the \$120,000,000 subway, while certain property owners, who have secured these tremendously increased property values, do not pay any more towards the cost of the improvement than any other taxpayer. Is that fair to the large number of other property owners?

A high-speed transit facility, from the very day of its projection and down through construction and operation, starts to build up certain definite advantages in the district through which it operates, and continues to add to these advantages indefinitely, increasing the beneficial effect to the property owners and others in the district. These advantages built up in a district by a high-speed railway are vital and important to trade, rentals and property values, and, if for no other reason than a matter of good business, one would think that property owners, looking at it even from a purely selfish viewpoint, would sooner make a contribution towards a portion of the cost of a high-speed line than not have such a line available, or at best have only a very limited opportunity to secure high-speed transit.

BENEFITED OWNERS WOULD PAY THEIR SHARE

Also, considering it from the standpoint of simple justice, the property owners who receive direct special benefit should, in all fairness, pay something more towards the cost of the line than other property owners who receive no special benefits. I believe that if the benefited property owners fully realize the situation that thousands of other property owners are forced to pay higher taxes than they should pay on account of an improvement from which they are getting no benefit, the benefited property owners would assume their honest and fair share of the burden and relieve the general taxpayer to that extent.

Property owners as a class have proved many times in the past that they do not shirk their responsibilities when they realize them, and judging by past experiences, I feel certain that most owners of property, who actually secure benefits by reason of a high-speed line, would not only be willing to pay a portion of their gain in a special assessment, but would also regard it as a fair and just method to provide the proper transportation necessary for a modern city.

Indiana Railroad

SPENDS \$980,000

for New Cars



One of 35 new high-speed interurban cars recently placed in service between Indianapolis, Fort Wayne and Louisville

COMpletely modernized interurban services on its routes between Indianapolis and Fort Wayne, Ind., and Indianapolis and Louisville,

Ky., were inaugurated during August, 1931, by the Indiana Railroad System, with the installation of 35 new high-speed cars. In addition, approximately \$500,000 was spent in improving and increasing power facilities between Indianapolis and Fort Wayne to permit faster schedules.

The new cars are an innovation in electric railway service in Indiana, incorporating the most advanced features of high-speed interurban car construction. Each is equipped with four GE-706 100-hp. motors. They are capable of a speed of more than 80 m.p.h., and their use is expected to effect a reduction of from 30 to 45 minutes in running time between Fort Wayne and Indianapolis and Louisville. The total cost of the 21 new coaches ordered from the Pullman Car & Manufacturing Company and the fourteen de luxe cars from the

Faster schedules will result from complete equipment of two interurban routes with 35 new high-speed cars. Rehabilitation program included expenditure of \$500,000 for improved power facilities

American Car & Foundry Company was approximately \$980,000, or \$28,000 per car.

Outstanding features of the new cars are the low, streamline bodies, high speed and quick-accelerating motors, auxiliary magnetic brakes, automatic electric heating, and battery lighting system providing steady interior illumination independent of the trolley voltage. High body sides and wide windows add to the attractive appearance. The bodies are constructed of light aluminum alloys of great tensile strength, resulting in a sturdier car than the older equipment, but which weighs approximately 50,000 lb. as compared with 90,000 lb. for the equipment now in service. The design of the car gives it an extremely low center of gravity. Wind resistance is reduced by the streamline and round contours of the body and the low arched-type roof.

Placing the motors close to the ground between specially constructed trucks eliminates most of the side sway as the car travels and makes it readily responsive to the

controls. The trucks, manufactured by the Commonwealth division of the General Steel Castings Corporation, are of the light-weight, equalized swing motion type, having a one-piece frame with integral pedestals and cast-steel bolsters.

Operation of the cars at the high speed of which the motors are capable is made safe through the use of the most modern double clasp brakes, two brake-shoes to each wheel. These brakes were designed and furnished by the American Steel Foundries. A system of electromagnetic brakes for auxiliary service is also installed. Another safety device is the automatic control with a deadman handle which automatically shuts off the current and applies the brake if the motorman releases the pressure of his hand.

Railway utility automatic electric heating equipment with thermostatic control will maintain comfortable temperatures in winter. In summer, electric fans will furnish cooling breezes. Illumination of the cars is by means of a double row of scientifically designed ceiling lights of high intensity—one above each double seat—which will permit reading without eyestrain. Each car is equipped with a motor-generator set and storage battery to insure continuous and steady lighting.

The interior decorations and appointments, including seats, carpets, draperies and painting were considered together, with the result that the effect is extremely pleasing, resulting in the utmost convenience and comfort. The standard coaches are equipped with Karpen chairs of the semi-individual type, upholstered in green and brown leather with head and arm rests. Wide, high windows and narrow posts on all sides of the car afford a maximum of glass area, and make the interior bright and cheerful.

OBSERVATION-LOUNGE A POPULAR FEATURE

In the fourteen de luxe cars there is an observation-lounge compartment, occupying the rear third of the car. These compartments, designed in detail by S. Karpen & Brothers, are decorated in two-tone shadings on walls and ceiling and are furnished with thick carpeting, deep upholstered chairs, solid walnut tables, parchment shades on reading lamps and a pair of tapestry settees. These compartments are available to all passengers without

Deep air-cushioned individual seats, attractive lighting and good ventilation make for the comfort of the passengers



An observation-lounge is available to all passengers without extra charge



extra charge. The observation-lounge compartments accommodate ten passengers, and the coach compartments in the same cars seat 28. The standard type coaches have a capacity of 41. Each standard coach has at the rear a baggage compartment approximately 6 ft. in length. Access to this compartment from the outside is through a sliding door which is operated by pneumatic control from the front platform. A special washroom equipped with the most modern fixtures is located near the center of each car. The new cars are built for single-end one-man operation. Passengers will enter and leave at the front.

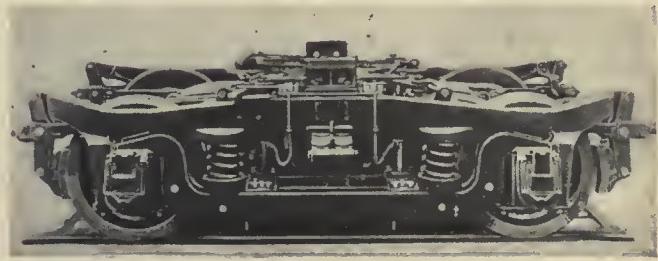
CARS EXHIBITED ALONG THE ROUTE

Previous to putting these cars into operation, the railroad system exhibited them to the public along the two routes during the week of July 18 to 25. The equipment placed on exhibition consisted of three two-car trains, each made up of one of the new standard coaches and one of the new de luxe cars with observation-lounge compartment. Just prior to the exhibition tours, a number of short inspection trips were run over the lines with representatives of newspapers, civic clubs and city officials as guests of the company.

The new time schedules under which the trains will operate between Indianapolis and Fort Wayne and between Indianapolis and Louisville, in approximately three hours, will not be made effective until several weeks after the cars have been in regular service and operators are thoroughly familiar with their control.



One-piece cast truck frame and completed truck used in Indiana Railroad's new cars



Analysis of the FINANCIAL

The analysis of the status of the industry and its present difficulties based on the United States Census data is very illuminating. I agree with Mr. Sisson that the education of the public as to the essential nature of mass transportation and the actual conditions under which it is now furnished is most important, and believe that in many instances some form of definite assistance, whether it is called a subsidy or not, must be substituted for the present practice of using mass carriers as tax collectors.

J. H. HANNA
President Capital Traction Company
President A.E.R.A.



I have rarely, if ever, read an article which so accurately diagnoses the troubles of the electric railways, and the underlying causes. I think we are indebted to Mr. Sisson for turning the searchlight of analysis on the electric railway situation, and setting forth the difficulties, and what may be done to meet them.

J. N. SHANAHAN
President Omaha & Council Bluffs
Street Railway
Chairman, Advisory Council A.E.R.A.



Mr. Sisson not only makes an analysis of the situation but also presents some genuinely constructive thoughts and suggestions. He recognizes three important factors:

Proper public relations—not political—an understanding by the masses that good transportation is a necessity and an asset to the community. Such a conception should ultimately bring about satisfactory working agreements.

Good service on an economical basis. In order to do this, changes may have to be made in rail routes, and buses and trolley coach operations co-ordinated.

Reasonable rates, yet as low as the service will stand. This is one of the most difficult problems we have. The industry, and rightly, has broken

Prominent officials of the electric railway industry make pertinent comments on the article by Francis H. Sisson which appeared in the August issue of Electric Railway Journal

away from the 5-cent fare, but fare structures, particularly in the smaller cities, are not satisfactory either to the public or to the companies. The public, while conceding the fares are not too high, look upon them as somewhat too expensive and curtail riding, while the companies still are unable to secure the additional revenue necessary to operate the properties properly.

The industry has made progress in many respects, particularly in curtailing expenditures, but increased gross must ultimately be obtained if tractions are to be placed on a sound basis.

H. S. ROBERTSON
President Denver Tramway



I have been much interested in reading the article "Mass Transportation," by Francis H. Sisson, vice-president Guaranty Trust Company, in the ELECTRIC RAILWAY JOURNAL for August, 1931. This article is a very clear and understanding presentation of the necessity, as well as the difficulties, of street railways, but to my mind the most significant thing about it is that a man of the personal and official standing and importance of Mr. Sisson should take the time and trouble to consider and analyze the situation and write such an article. It should make a deep impression upon all of those in places of public authority to whom the problems of the street railway and local transportation system have to come for consideration.

WALTER A. DRAPER
President Cincinnati Street Railway



I have reviewed Mr. Sisson's paper with much interest and found it an excellent treatise on a matter which is causing much concern to the

electric railway companies at this time.

It not only mentions the difficulties that beset the industry and the handicaps imposed that prevent economies in operation to an extent enjoyed by non-regulated corporations, but it also offers many good suggestions for remedying the situation. Foremost among these is the thought that the public must be impressed with the fact that transportation service, like every other service, must be paid for. When this fact is realized, then only will the industry eventually emerge from its present plight.

I believe that articles of this nature play no small part in creating and fostering public good will in behalf of the industry, and to that extent should be encouraged wherever possible.

F. R. PHILLIPS
President Pittsburgh Railways



Mr. Sisson's article sums up the street railway situation in a very intelligent and comprehensive way. I think it is very true, and at the same time unfortunate, that so few leaders of business and industry and also organs of public opinion have interested themselves in this important problem with a view toward ascertaining the facts.

In our own cause, for instance, the Municipal and Public Utility Board, which would commonly be referred to as Public Utility Commission, recently completed an exhaustive and very complete investigation into our whole situation, but, strange to say, no car riders nor any of the citizens attended any of the hearings nor made any representations in any manner. There were present, of course, the usual solicitors for the various municipalities interested, but

SITUATION

Found Helpful

other than this there were no appearances.

We have endeavored to enlighten the public relative to our problems in various ways, including, among other things, radio talks, talks by members of the organization to various service clubs, and, of course, we have included a lot of articles in our *Public Service News* which is issued twice a month through the "Take One" boxes on the street cars, but it appears very difficult to register any impression. Personally, I have the feeling that a large group of the public do not really take us seriously and figure that what we say or write is propaganda, which perhaps, it is in one sense, but we are in fact telling the truth, and I am inclined to think too many of the citizens think we are "stringing" them, so to speak. How to overcome this is a puzzling question which I personally should very much like to have an answer to.

C. H. DAHL
Vice-President
Winnipeg Electric Company

cos

Mr. Sisson has given us something really constructive. Some may say that he has told us nothing new, but to my mind he has given us a critical analysis which merits our careful attention, coming as it does in a friendly, inspiring way from one particularly versed in public relations and public reactions. I want to emphasize what seems to me to be the underlying thought in Mr. Sisson's conclusion, namely, that our problem "should not be insurmountable if the public thoroughly understands the situation." He had previously pointed out that "the general attitude of business men and the public had been one of indifference" but that "intelligent co-operation between public officials and company managers" was most essential so that the public might be brought "to a realization that transportation service, like every other service, must be paid for."

We are today attempting to do what Mr. Sisson tells us must be done, but we have not yet found the solution. This means that, if we are right in our thought, and Mr. Sisson tells us we are, we must just keep everlastingly at it. This problem must be solved. It is an obligation which we owe our communities. We have every right to be discouraged if we are looking for excuses, but we must not—we cannot—lay down. Public transportation is a public necessity and, as such, must be paid for. If we cannot sell this thought to public officials, the fault must be at least partially ours. Let us take another look at ourselves and see whether it is true, as we have so often thought before, that we have already done everything possible. Let us take a fresh hold and a firmer grip—it is our job.

W. H. SAWYER
Executive Engineer
New York

cos

Mr. Sisson's article is a very interesting one, and a very complete one from a banker's viewpoint. The final sentence, "The public must be brought to the realization that transportation service, like every other service, must be paid for, and that unprofitable service is necessarily bad service," is a problem which is facing practically all of the street railway companies, but so far no successful solution has been offered. The raising of street railway fares in a city like New York would undoubtedly be the solution, but the raising of street railway fares in most other cities is not the solution, although it may be essential to carry the company over a gap, with the hope that conditions are going to change.

A large part of the decrease which all street railways are suffering in passenger traffic is during the midday and night. Our peak requirements, which involve carrying the wage earners to and from work, have remained approximately constant over

a period of years. All of our checks continue to show that we are hauling the majority of shoppers, the last one in St. Paul averaging 70 per cent, with 55 per cent as a minimum and 87 per cent maximum. We are not hauling people who are pleasure bent at any time during the day or night, and the automobile has proved itself to be more convenient for a great many, who, in their profession or business must call in different locations. We of course have also lost large numbers, who, regardless of expense or convenience, are riding to work in their own automobiles, and are taking with them or picking up street car riders. These are some of the causes that have reduced the street car patronage to a point where street railway properties cannot earn a fair return on their investment.

Cities of several hundred thousand inhabitants and larger all have the same problem, as office buildings, retail stores, hotels and business headquarters are located in a small business district, and the only known way to get the people to and from that district is with street cars. If street car transportation fails, then downtown property values will be reduced to a minimum. This in turn will reduce taxes collected by the city to such an extent that an excessive burden will have to be placed on all other property. It is, therefore, my judgment that if the street railway companies cannot serve the masses on account of lack of revenues, then the cities will have to subsidize the street railway properties.

The city cannot stand aside and allow its mass transportation to become dilapidated, as it is very doubtful if sufficient capital could afterward be attracted to rehabilitate the system.

This problem is now being minimized in the minds of the city authorities by a lot of loose talk concerning the over-capitalization of the street railways, the hiding of earnings, and the substitution of buses, the latter on the general theory that track transportation is obsolete. The automobile industry and the automobile user, by concerted action throughout the country, have gotten all cities convinced of the essentiality of spending tremendous amounts for



URGES TAX RELIEF FOR ELECTRIC ROADS

F. H. Sisson Also Favors Assessing Beneficial Property for Part of Facilities' Cost.

SEES BIG AID IN PUBLICITY

He Declares an Aggressive Effort to Put "True Situation Before the People" Is Needed.

The best solution of the problem of the electric railway industry probably will be found to vary with local conditions, says Mr. Francis H.



Newspaper comment on Mr. Sisson's article

widening streets, and offering every other facility for the convenient use of the automobile. The street railway industry in a similar manner must convince all of the cities of the necessity of spending sufficient money so that the great majority of their inhabitants can continue to have adequate service to and from work and for shopping.

T. JULIAN MCGILL
Vice-President
Twin City Rapid Transit Company



I have read with keen interest the article in the August issue of *ELECTRIC RAILWAY JOURNAL* entitled "Mass Transportation Must Be Placed on a Firm Financial Basis," by F. H. Sisson, vice-president of the Guaranty Trust Company, New York City. We all agree, of course, with Mr. Sisson that it is desirable and essential, both from the standpoints of the managements and of the public, that a fair return be earned by those supplying the public necessity of transportation. There is no cure-all or single theory that can be applied universally to meet the existing conditions in the various cities throughout the nation. Managements must apply the corrective measure that is best suited to meet the individual conditions which they encounter.

Mr. Sisson outlines several theories which are worthy of serious consideration, and undoubtedly some of his suggestions can be applied profitably, either in whole or in part, by many managements.

Whatever the plan decided upon by those in charge of electric railway properties to relieve them of their pressing financial dilemma, I believe a successful conclusion depends largely upon education. Our previous endeavors to inform the public have been more or less along hit-and-

miss lines. We have not concentrated these efforts sufficiently where the most is to be accomplished—that is, among business men and governing political bodies.

Despite all that has been said and written, the more influential citizens do not yet fully appreciate the real value or significance of public transportation. They have become so accustomed to using their private means of transportation that they lose sight of the fact that the large masses are dependent upon public transportation and that it is in the public interest that those supplying this service be permitted to earn a fair return. Once the railways receive the full benefit of a complete understanding by business men, and governing bodies fully appreciate the problems of electric railways, the way will be paved for applying the corrective measures best suited for relief.

D. W. PONTIUS
President Pacific Electric Railway



Mr. Sisson has laid his finger upon one of the most serious phases of the current situation in the urban mass transportation business. The practical absence of credit in this industry makes exceedingly difficult, if it does not prevent, constructive measures for the improvement of the essential service which it renders to the public.

There can be no dispute that the surface electric railways must continue to be the backbone of the local transportation systems in our larger cities where the mass transportation problem is involved. It is high time that the serious situation, which has confronted this industry since the outbreak of the European war, should be realized by the business community at large, and constructive and adequate steps taken to restore

this essential industry to a firm financial basis. The recent action of the United States Chamber of Commerce, recommending that such a study be made under the auspices of the Chamber, is encouraging evidence of the growing realization by the financial and business leaders of our larger cities, and of the country as a whole, that the electric railway industry must have help in working out a constructive solution of its problems, and that the entire community has a vital interest in the attainment of this end.

I do not believe the problem can be solved through the individual efforts of the companies engaged in mass transportation. Some concerted collective action by all of the companies in this industry, acting in co-operation with such organizations as the United States Chamber of Commerce, is required. It is imperative that a constructive solution be found, for the orderly and progressive development of our large cities is being hampered by the limited credit—or the entire absence of credit—of the local transportation companies, which makes it impossible for these companies to keep pace with the march of progress and to aid in the orderly development of the communities which they serve.

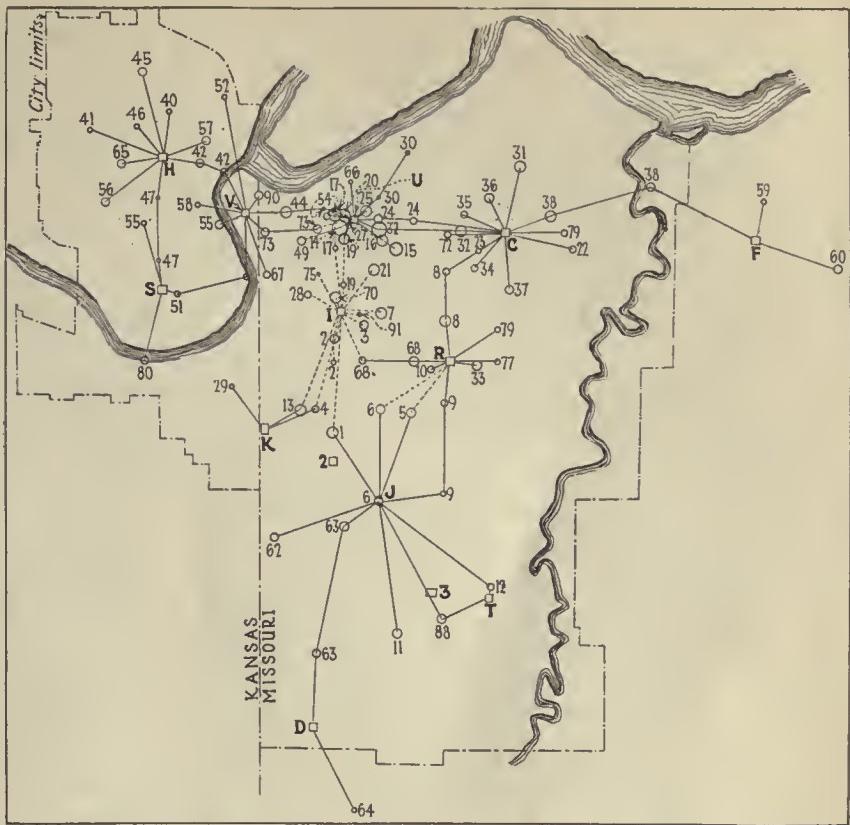
THOMAS CONWAY, JR.
President Cincinnati & Lake Erie Railroad



This article is a real message to the industry and might very well be passed on in some fashion to the public citizen. Mr. Sisson presents his case in a clear and comprehensive manner and proves conclusively that the electric railway is absolutely essential to urban life, but for political reasons the investor in its securities is barred from a legitimate return on his money. In the last three paragraphs on page 398, Mr. Sisson suggests a solution. In my opinion, this is the gist of the article, and it seems too bad that we cannot get this type of information across to "the fellow on the street," the lad who elects city and county officials, just to combat the political "hooey" he gets through the average newspaper. We talk to ourselves at convention meetings and we produce splendid articles in our journals, but we do not get beyond this often enough and get the attention of the public.

T. W. CASEY
President National Pneumatic Company

Kansas City Reorganizes Distribution System



The layout of the Kansas City distribution system showing the first stage in the reorganization plan

Plans have been adopted for ultimate construction of three new substations, increased capacity at two more and abandonment of five others. Better car operation and many economies will result

WORK has begun on the first stage of a plan which ultimately will reorganize the power distribution system of the Kansas City Public Service Company. This change has been decided on because of the expansion of Kansas City to the south, rather than to the southwest and southeast, as was anticipated in 1916, when the present system was laid out.

The work now in progress consists of the construction of a new 4,250-kw. substation at 25th and Oak Streets, the abandonment of two other substations, those at Fifteenth and Walnut Streets and 31st and Holmes Streets, with a total capacity of 6,500 kw., and the transfer of equipment released to the substations at 1017 Oak Street and 31st and Montgall Streets to increase their capacity by a total of 2,500 kw. In addition to this substation work, automatic feeder breakers will be installed at 37 important stub ends and crossings, and direct-current feeders will be placed in underground ducts at the 1017 Oak Street station.

While this work was necessitated by the condemnation, due to the widening of Fifteenth Street, of the railway's present office quarters, in which a substation was located,

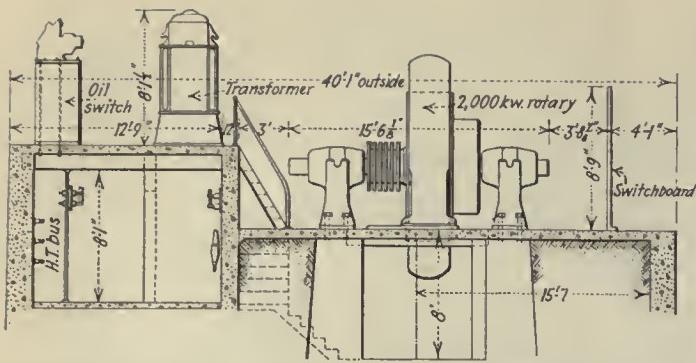
it is a part of a general plan to modernize the entire power system to improve its characteristics materially. Construction of the 25th Street substation and the elimination of those at 31st Street and Fifteenth Street are expected to reduce the power operating expenses by approximately \$7,000 per year.

Before the present construction program was started, the Kansas City Public Service Company had a converter capacity of 32,500 kw., distributed among thirteen substations, with a 500-kw. portable station at Merriam, Kan. Table I gives the location, name, and machine capacity of each station:

Table I—Locations and Ratings of Kansas City Substations

Location	Converters		Station Capacity Kw.
	Number	Rating, Kw.	
A 31st and Holmes.....	4	750	3,000
B 15th and Walnut.....	1	1,500	3,500
C 12th and Cleveland.....	1	2,000	7,000
D 75th and Wornall (Automatic).....	2	3,000	750
F Van Horne and Blue (Automatic).....	1	1,000	1,000
H 10th and State, K. C. Kan.....	2	1,000	2,000
J 48th and Troost.....	3	1,000	3,000
K 40th and State Line.....	1	1,000	1,000
R 31st and Montgall.....	1	1,500	1,500
S 10th and Scott, K. C., Kan.....	1	1,000	1,000
T 59th and Swope Parkway (Automatic).....	1	750	750
U 1017 Oak St.....	2	3,000	6,000
V Central and James, K. C., Kan.....	1	2,000	2,000

A system load study revealed unequal loading of the various stations. Five substations are near their load centers and carry full load during maximum peak demand. One substation, Twelfth and Cleveland, while near its load center, has fair capacity and is capable of carrying greater loads. The substation at Fifteenth and Walnut, while heavily loaded, has its load center near



The new substation at 25th and Oak Streets was designed for economies in construction. Costly excavation work was held at a minimum.

Eighteenth and Grand. The substation at 48th and Troost has spare capacity, is feeding long distances and has its load center near 55th and Troost. The substation at 31st and Holmes, while carrying a full load, transfers the bulk of its output to Main Street, or into territory which should be supplied by the station at 31st and Montgall. The latter station is found to be at its load center, is operating at reduced voltage and has need for more machine capacity. The substations at 59th and Swope Parkway and at 40th and State Line are found to be so far from their load centers that they cannot be used to advantage.

The ultimate plan for the power distribution system will effectively improve the load factor of each substation, permit better car operating conditions and materially reduce power costs. In addition to the work now being done, as mentioned above, two more substations will be built. One, with a capacity of 3,000 kw., will be located at 43rd and Main, and another with a total capacity of 1,500 kw., at 59th and Prospect. The three substations located respectively at 40th and State Line, 48th and Troost, and at 59th and Swope Parkway will then be discontinued. Automatic equipment will be installed at Tenth and Scott Street, Kansas City, Kan., replacing that in the substation eliminated at 59th Street and Swope Parkway.

The approximate cost of the above changes, including land, buildings, disconnecting machines, drayage, installing machines at new locations, feeder and transmission changes and necessary new equipment is estimated at nearly \$157,000. The work which is now in progress, which will be completed within a short time, will cost approximately \$85,000. It is hoped that the ultimate plan will be completed before the end of 1932.

The advantages of the ultimate plans are:

1. There will be better car operating conditions. Reduced voltage will be furnished in the downtown area,

Table II—Estimate of Annual Saving Under Ultimate Power Distribution Plan

	Present	Ultimate
New equipment, 10 per cent.....	0	\$1,769
Buildings, 10 per cent.....	\$3,574	3,300
Attendance.....	19,500	11,400
Additional a.c. cables and ducts, 9 per cent.....	.....	4,328
Additional d.c. feeders, 9½ per cent.....	.....	1,143
Feeder losses.....	7,972	4,632
	\$31,046	\$26,572
Annual savings.....		\$4,474

Table III—Estimate of Annual Saving Under First Step of Power Distribution Plan

	Present	First Step
New equipment, 10 per cent.....	0	\$1,440
Buildings, 10 per cent.....	\$1,316	.....
Attendance.....	10,000	.....
A.c. cable and ducts, 9 per cent.....	.....	.....
D.c. feeders, 9½ per cent.....	.....	.....
Feeder losses.....	4,108	2,671
	\$15,424	\$12,069
Annual savings.....		\$3,355

so that the current demand per car will decrease, resulting in smoother acceleration and less car resistance loss. In the important outlying districts there will be higher line voltage, which will give faster accelerating rates and higher possible schedule speeds.

2. With automatic feeder breakers tied in to the important trolley sections the copper losses will be reduced from one-half to three quarters of their present values. The voltage drop curve along the trolley will be similar to a catenary instead of a straight line.

3. With the substations transferring current through the automatic feeder breakers, the peak loads of short duration that occur as the load moves past a station will be smoothed out, giving lower maximum currents extended over longer periods, thereby giving more uniform load factors and more reserve capacity in the major stations.

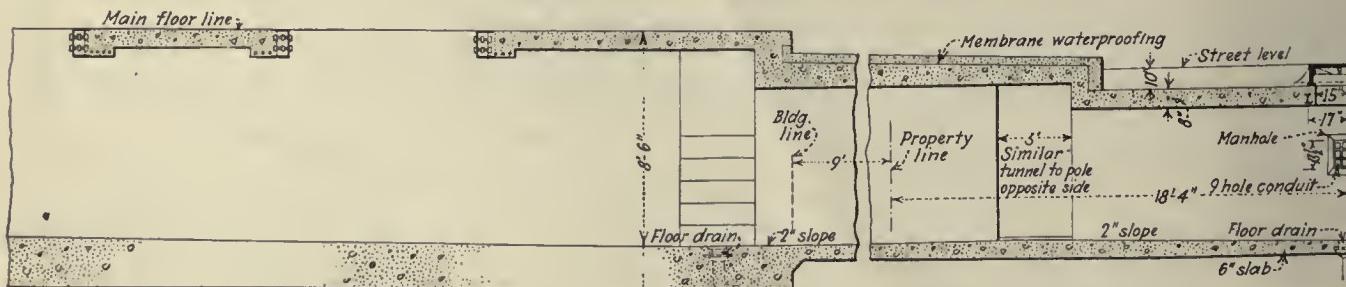
4. Building maintenance will be materially reduced with two less stations.

5. The number of operators required will be reduced by four.

An estimate of the annual charges on the affected stations under the ultimate plan indicates a saving of \$4,474. This is derived as shown in Table II.

The energy savings are only those which will accrue in the feeders due to shorter feeding distances, to heavy loads and the installation of automatic feeder breakers. Intangible savings, such as those due to reduced voltage in the downtown area and more uniform station loading, are not shown.

Under the first step of the ultimate plan, the annual charges on the affected stations will be \$3,355. Details of the estimate are given in Table III.



Power transmission leads will be carried under the street surface at the new substation

Broad FIELD OF USE

for the

Trolley Bus

To show the field for the trolley bus the author has analyzed figures on costs in a paper, presented before the Midwest Electric Railway Association

By
CHARLES GUERNSEY
 Chief Automotive Engineer
 J. G. Brill Company

PERHAPS no American industry has been forced to make such a rapid change of conditions as transportation has in the past fifteen years. The general use of the private automobile, with the concurrent building of improved streets and highways, and the resultant increase in speed and density of street traffic, has had a serious effect on public transportation. And apparently this transition is not yet complete. To meet these changing conditions, it is necessary that the electric railways make the best possible use of the various means of transportation which are available, including rapid transit, the surface car, trolley bus and gasoline bus, each in its proper field.

The trolley bus of current type is a comparatively recent development, which seems to have a distinct and broad field between the trolley car and the gasoline bus. In its proper sphere it can serve the needs of a community better and at less cost to the operating company than any other vehicle.

Various authorities have defined the field for the trolley bus as being limited to a minimum of about one-minute headway during rush hours and a maximum of about a twenty-minute headway in off-peak hours. With the 40-passenger type now generally used, this means

Table I—Direct Operating Costs, in Cents Per Mile

	40-Pass. Trolley	40-Pass. Gasoline	30-Pass. Trolley	30-Pass. Gasoline
Wages of operator.....				
Power or fuel, including gaso- line tax and engine oil.....	5.70	6.55	5.70	6.55
Maintenance of way.....	2.40	4.70	1.80	3.60
Maintenance of equipment.....	.70	6.80	.70	6.20
Garage.....	5.60	1.60	4.40	1.10
Other transportation.....	1.20	1.20	1.20	1.50
General and miscellaneous, in- cluding taxes.....	3.90	4.20	3.70	4.00
Total.....	20.70	25.05	18.60	23.05

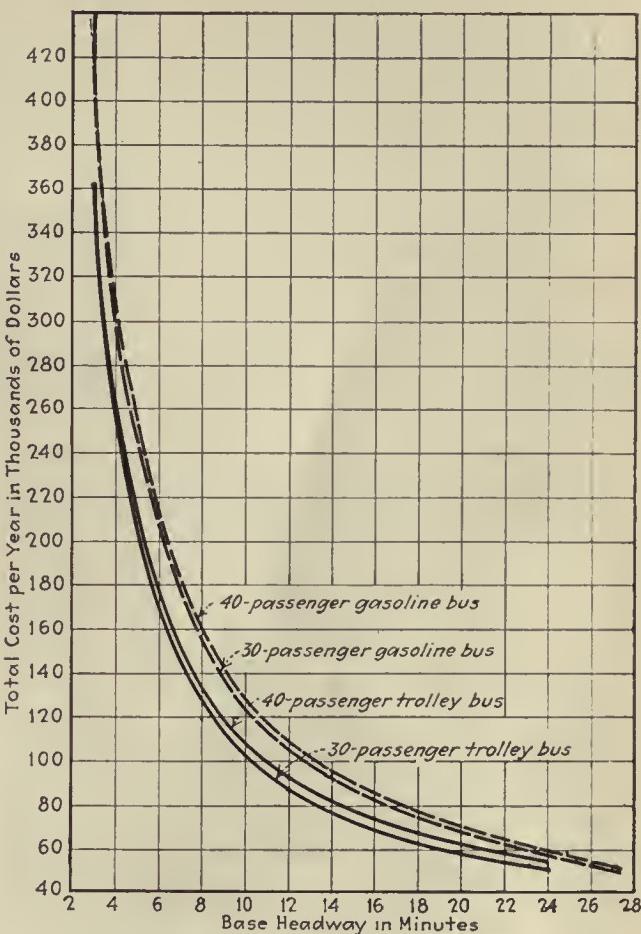


Fig. 1—Comparative total operating costs per year for 30 and 40-passenger trolley and gasoline buses, for various headways

a maximum of 4,500 passengers per hour and a minimum of about 100 passengers per hour on base schedules. With the 30-passenger vehicles the same headway can be maintained at lower cost, and if a larger vehicle could be developed a higher peak load could be handled on the same headway.

To show the cost for operating trolley and gasoline buses under varying conditions, two tables and three sets of curves are presented. Table I gives the direct operating costs in cents per mile for trolley and gasoline buses of the 40 and 30-passenger types. These figures show that the larger size trolley bus can be operated for 4.35 cents per mile less than the gasoline bus, while the smaller capacity trolley bus can be operated for 4.45 cents less than the gasoline bus of corresponding size.

Table II analyzes all the costs in operating a typical 10-mile line (round trip) with the four mentioned types of vehicles. The light traffic figures, for a peak load of 600 passengers, are based on the assumption that peak service is not appreciably greater than base service. The figures for heavy traffic, on the other hand, are for a peak service which, in proportion to the base service, is comparatively heavy. For the light traffic conditions, the trolley buses have a considerably less cost per mile and per seat-mile than the corresponding sizes of gasoline buses. For the heavy traffic service the trolley bus figures are even more favorable.

Table II—Operating Costs, 10-Mile Line (Round Trip) with 30 and 40-Passenger Trolley Buses and Gas Buses
 (Figures based on four peak and fourteen base hours for 300 days and eighteen base hours for 65 days.
 Also eight stops per mile on peak schedule and six on base.)

	Light Traffic, Peak Load of 600 Passengers				Heavy Traffic, Peak Load of 2,400 Passengers			
	40-Pass. Trolley Bus	40-Pass. Gasoline Bus	30-Pass. Trolley Bus	30-Pass. Gasoline Bus	40-Pass. Trolley Bus	40-Pass. Gasoline Bus	30-Pass. Trolley Bus	30-Pass. Gasoline Bus
Maximum passenger capacity per vehicle.....	80	80	60	60	80	80	60	60
Peak headway, in minutes.....	7.50	7.80	5.70	5.67	2.02	2.01	1.50	1.48
Peak schedule time, in minutes.....	52.5	62.5	57.0	62.5	52.5	62.5	57.0	62.5
Vehicles required during peak hours.....	7	8	10	11	26	31	38	42
Base headway, in minutes.....	12.0	13.5	12.0	13.5	4.8	4.9	4.8	4.9
Base schedule time, in minutes.....	48	54	48	54	48	54	48	54
Vehicles required during base hours.....	4	4	4	4	10	11	10	11
Vehicle-miles per year—Peak.....	100,500	96,000	132,000	132,000	375,000	372,000	501,500	505,000
—Base.....	250,800	214,800	236,000	214,800	697,000	680,000	697,000	680,000
—Total.....	351,300	310,800	368,000	346,800	1,072,000	1,052,000	1,198,500	1,185,000
Operating cost per mile, in cents.....	20.70	25.05	18.60	23.05	20.70	25.05	18.60	23.05
Annual operating cost.....	\$72,500	\$77,700	\$68,400	\$80,000	\$218,500	\$264,000	\$222,000	\$272,500
Investment—Line.....	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000
—Substation.....	12,250	—	12,500	—	45,500	—	47,500	—
—Vehicles (10 per cent spares).....	100,000	99,000	99,000	102,000	350,000	374,000	378,000	382,500
—Total.....	\$182,250	\$99,000	\$181,500	\$102,000	\$465,500	\$374,000	\$495,500	\$382,500
Depreciation—Line and substation (20 years).....	4,112	—	4,125	—	5,775	—	5,875	—
—Trolley bus (10 years).....	—	—	—	—	—	—	—	—
—Gasoline bus (7 years).....	—	—	—	—	—	—	—	—
—Total.....	—	—	9,900	—	35,000	—	37,800	—
Interest on half amount, at 6 per cent.....	5,467	2,970	5,445	3,060	13,965	11,220	14,880	11,460
Fixed charges.....	19,579	17,120	19,470	17,640	54,740	64,650	58,555	66,100
Total annual costs.....	92,079	94,820	87,870	97,640	273,240	328,650	280,555	338,600
Total cost per mile, in cents.....	26.2	30.5	23.9	28.3	25.4	31.2	23.5	28.6
Total cost per seat-mile, in cents.....	0.658	0.764	0.797	0.945	0.637	0.780	0.785	0.955

The curves in Fig. 1 show total annual operating costs, plotted against various base headways. They indicate that the cost of operating the 30 and 40-passenger trolley buses in this service over a wide range of headways, varies only slightly, with a small advantage in favor of the larger vehicle. By using enough 30-passenger vehicles to maintain the desired minimum headway and larger vehicles for additional service during peak hours, the operating costs can be still further

be materially reduced, reacting to the benefit of the trolley bus. The curves in Fig. 3 show the cost per seat-mile for headways varying from 3 to 24 minutes. Throughout this range the trolley bus costs are considerably under those for the gasoline bus.

On lines which maintain a base service which is not a great deal under the peak service, the 30-passenger trolley bus would have several advantages. It can be operated at a lower cost than the other vehicle and in addition maintain a shorter headway during peak hours. However, on a longer headway the 30-passenger gasoline bus becomes cheaper per year although still costing more per mile than the trolley bus. Under these conditions the trolley bus seems to be cheaper until the base headway of approximately 34 to 35 minutes is reached. Again, due to peak service, the average headway at the critical point is less.

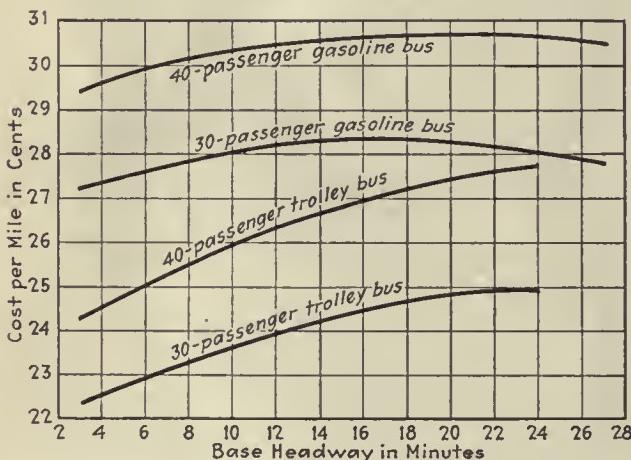


Fig. 2—On base headways of 3 to 27 minutes the costs per mile for trolley buses are lower than those for gasoline buses

reduced. While the gasoline bus is cheaper on over-all costs on the longest headway taken, the comparison is made with a definite minimum number of vehicles, rather than with a definite headway or mileage, and where the gasoline bus operates the same number of miles per year as the trolley bus, the cost would then be higher. This is brought out in the curves of Fig. 2, showing the cost per mile for various headways. If the curves showing cost per mile of 40-passenger gasoline buses and trolley buses are projected until they meet, it indicates that under these conditions the trolley bus can operate at a lesser cost per mile on a base headway of about 40 minutes or less.

Line and substation costs are included at replacement values in the figures used for the curve. If substations are already in service, or if installation involves only the adding of a second wire to an existing trolley car overhead, then the cost for installation of line would

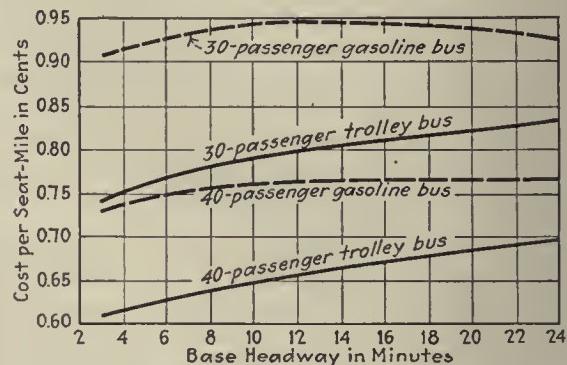


Fig. 3—Unless service is quite infrequent, the cost per seat-mile for trolley buses is less than for gasoline buses

These costs are based on frequent stop service. Where the distance between stops is greater, allowing the gasoline bus to take advantage of its higher free running speed, conditions undoubtedly would be more in favor of the gasoline bus. In general, the trolley bus seems to be cheaper than the gasoline bus for frequent stop service for mean headways less than 20 to 30 minutes, depending on conditions. Much greater frequency than 20 to 30 minutes headway must be maintained to hold city service traffic, so the gasoline bus seems to be limited to the boulevard, suburban and interurban operation. On close headways, the rail car can undoubtedly handle traffic at lower cost than the trolley bus, if the track and other facilities are in existence.

Riding Increased

Installation of weekly pass coincident with increase in cash and token rate satisfy company and public. Subsequent experiments with passes and transfers bring new business. Simplicity in collection aids increased speed

in Milwaukee by

WEEKLY PASS and FARE

EXPERIMENT

FAVORABLE reception of the weekly pass by Milwaukee's riding public is attested by an increased volume of riding. The new fare structure, inaugurated by the Milwaukee Electric Railway & Light Company on May 4, 1930, which provides for a 10-cent cash fare, six tickets for 50 cents ($8\frac{1}{2}$ -cent rate) and a \$1 weekly pass, has been beneficial to revenue, stimulated short-haul riding and improved the system load factor. In addition to this new basic fare structure, various special pass rates tried for limited periods, usually seasonal in character, have attracted new riders and more revenue.

Prior to the installation of the present fares, the rates were 7 cents cash and eight tickets for 50 cents within the "single-fare" area, having a radius of approximately 4 miles of downtown Milwaukee. In the outlying districts, a zone system prevailed, the zones being approximately 1 mile, with a cash fare of 3 cents per zone and 25 tickets for 50 cents. A person riding from the single-fare area into the suburban or zone area would pay the basic fare, plus a fare for each zone through which he rode.

The railroad commission's order changing the fare structure at the same time extended the radius of the single-fare area to approximately $5\frac{1}{2}$ miles from downtown Milwaukee, and set the zone rate at 3 cents cash, or twenty tickets for 50 cents. There was a weekly pass selling at \$1.75, good in the single-fare and suburban area. As a consequence, although there was some increase in the zone ticket rate, a very large part of the suburban or zone revenue was wiped out by the enlargement of the single-fare area. This lost revenue, amounting to something in excess of \$300,000 annually, must be made up by the new rates before the company breaks even in total operating revenues.

The commission's order made public on the evening of May 1, 1930, said that all tickets sold at the old rate until the order became effective Sunday morning, May 4, would be valid for transportation. Obviously, during Friday and Saturday preceding the effective date of the order there was a great rush for these "bargain tickets," and at least \$150,000 worth were sold. For several months they kept coming into the fare boxes, and even

as late as August, 1930, about 10 per cent of all the tickets lifted were purchased at the old rate of eight for 50 cents. As it worked out, however, this bargain sale of tickets was an advantage because in the public mind it took off the edge of an increase in fare to those people who could not possibly use the weekly pass.

Due to these rather unusual features of fare adjustment, complications in revenue accounting made it impossible to get a direct measure of the financial effect of the new fare structure in its beginning. If all the tickets lifted subsequent to the change had been of the $8\frac{1}{2}$ -cent value, the company would have experienced quite a material increase in revenues, even after making up the loss due to the elimination of suburban fares. In addition, there has been a continued increase in industrial layoffs due to the general economic depression, so that without a fare adjustment the revenues would certainly have been less than they were in comparative periods of the preceding years. Actually, the revenues have held on an even keel.

The volume of riding, however, can be determined rather definitely. All figures indicate increased patronage compared with 1929. Within a few months the number of passengers carried increased about 30,000 per day. In the second week of June, 1930, the sale of passes amounted to 80,658. In the third week of August of the same year, 71,000 were sold. This decrease was purely seasonal. However, the sales picked up in the early fall and during the second week of March, 1931, a top sale of 88,337 passes was attained.

From periodical checks of the riding, it was determined that those people who previously used tickets or cash, and who were now buying weekly passes, formerly rode sixteen times per week. Further checks have indicated that the present use of the pass is about 31 rides per week, or, after making adjustments for transfer from car to car, 22 origin-to-destination rides per week. Thus, the riding of each passholder has been stimulated to the extent of six rides, and a passholder's average fare

is about $4\frac{1}{2}$ cents. This additional riding is practically all off-peak, as there has been no increase in peak riding. There has been a definite tendency for people who previously stayed downtown at noon to go home to lunch, and there has been a noticeable increase in short-haul riding. The distribution of revenue at present is approximately 28 per cent cash, 22 per cent ticket, and 50 per cent pass. The distribution of riding is approximately 16 per cent cash, 17 per cent ticket and 67 per cent pass. Cash fares have held up remarkably well and better than was expected.

Passes are good from 5 o'clock Sunday morning to the same time on the following Sunday. They are on sale on the cars from the preceding Saturday until Tuesday night. For the remainder of the week, passes may be purchased at the company's ticket offices. The majority of passes are sold on Sunday, the lightest traffic day. Monday sales are the next highest, but they have not slowed down the schedules. Between 2 and 3 per cent of the weekly passes are sold on Saturday and the sales after Monday are approximately the same percentage of the week's total. With the pass priced conveniently at \$1, and with a large volume of sales before Monday morning, there is practically no interference or congestion on the early Monday morning trips. The pass is transferable and unlimited as to quantity of riding during the week.

PASS AIDS SPEED IN OPERATION

The extensive use of the weekly pass on the system has definitely contributed to an increase of operating speed. Although not entirely attributable to the new fare structure, inasmuch as the company has made particular efforts to speed up its service, the simplicity of the new fares has had a great deal to do with making this increase in speed possible. For the first six months of 1930, the average speed, as shown in the table, was 9.33 m.p.h. against 9.70 m.p.h. this year. Further, there has been a decrease of 1.3 per cent in car-miles and 5.1 per cent in car-hours, notwithstanding the appreciable increase in riding.

It is interesting to note in this connection that, due to industrial conditions, there has been quite a material decrease in peak-hour riding across the maximum load points. Generally, also, there has been some increase in riding across the maximum-load points during the off-peak hours, but not enough to offset the decreases in the peaks. In other words, while there is a better distribution of riding across the maximum-load points, the whole volume is less than it was a year ago. Notwithstanding this, there is actually more riding on the system as a whole than there was last year. This apparent paradox is undoubtedly due to the short-haul riding, either downtown or in the outlying districts, stimulated by the weekly pass. The desirable effect of all this upon the load factor of the railway system can be readily appreciated.

ADDITIONAL FARE EXPERIMENTS TO PROVIDE FOR SEASONAL TRAFFIC

In addition to the basic weekly pass, the Milwaukee Electric Railway & Light Company has experimented with less expensive limited-use passes. These, in general, have been seasonal in character, and designed to increase off-peak riding. During the Christmas holiday season a 75-cent limited pass was sold. Later, holders of regular weekly passes were permitted to carry two

A Speed Increase in Milwaukee Follows Use of Pass

Period	Car-Miles	Car-Hours	per Car-Hour
Jan.-June, 1931	12,172,707	1,255,295	9.70
Jan.-June, 1930	12,332,170	1,322,796	9.33

children of half-fare age free on Sundays. In addition, a 75-cent shopper-theater pass was instituted.

The off-peak pass was introduced temporarily to determine how popular such a plan would be. It was not advertised as a trial installation but as a special Christmas shopper's pass designed to relieve rush-hour congestion and to stimulate holiday trade. It was in effect from Nov. 30, 1930, to Jan. 3, 1931, inclusive, a period of five weeks. On week days, the pass was good except from 5 a.m. to 9 a.m., and from 4 p.m. to 7 p.m. On Saturdays, it was good at all times except between 5 a.m. and 9 a.m. On Sundays and holidays there was no time limitation. In order to avoid disputes a tolerance of 20 minutes was allowed, although, of course, no public announcement of this was made. The disputes were surprisingly few.

Approximately 3,000 Christmas shopper's passes were sold each week, as compared with about 85,000 of the \$1 or unlimited passes. Peculiarly, during the first week in which the 75-cent passes were sold there was a very marked increase in the number of \$1 pass sales. Whether this was merely seasonal or not it was difficult to determine exactly, but it was believed that the publicity with respect to the off-peak pass stimulated in some measure the sales of the unlimited passes. Several comments were received to the effect that persons would as soon pay the extra 25 cents for the privilege of riding at all hours. Incidentally, the off-peak pass was instrumental in developing considerable good will, although apparently the difference in price between the limited and unlimited pass was not sufficient to create a large demand for the former.

Beginning on Feb. 1, 1931, a plan was in effect for two months on the Racine and Kenosha systems, as well as on the Milwaukee system, of permitting passholders to carry two children of half-fare age free on Sundays. If a child presented a pass, he was permitted to carry two additional children. Checks made indicated that between 28,000 and 30,000 children were taking advantage of these free Sunday rides. In developing the idea, it was believed that it might have some publicity and good will value and that it might directly or indirectly be responsible for the sale of some additional weekly passes.

SIMPLIFIED TRANSFERS USED

On April 12, 1931, the company inaugurated a new simplified transfer for a three-month trial, with all restrictions removed except time. In other words, transfers are now good in any direction without regard to originating line, and passengers may board at any point instead of only at transfer points as heretofore. Transfers are punched for a time allowance of not less than one hour or not more than $1\frac{1}{2}$ hours. The plan is to simplify the rather complicated transfer arrangements which were in effect and cause as little annoyance as possible to the passenger, so that the trainmen could be more strict in refusing transfers upon which the time limit had expired. It was believed better to have a simple transfer about which disputes could not easily arise than to have a transfer with complicated rules which neither passenger nor operator could comprehend.

In addition to simplification, the transfer partially accomplishes the desired effect of giving a lower rate

of fare to the short-haul rider. A long-haul rider cannot use the transfer and have much time left for shopping or errands, whereas a short-haul rider would have considerable spare time. It was hoped that whatever loss in revenues there might be as a result of this new transfer would be at least offset by the riding stimulated, and that there might be experienced an actual gain in revenue. There is no reason to believe that the new transfer has not been successful, although not enough time has elapsed to determine results definitely. Consequently permission has been obtained from the Public

Beginning on June 22, 1931, a special 50-cent interurban summer night pass was inaugurated. This pass is good for one night after 6 p.m. to any point on the interurban system, not only for a round trip but including stopover privileges. The summer night pass gives the holder full use of the interurban system for one evening for 50 cents. The pass can be purchased any evening from Monday to Friday inclusive. The philosophy here was that the evening riding on the interurban was so small that there was practically no revenue to be lost by such a pass. Before the pass was introduced,



All the weekly and the shopper-theater passes are printed in lively colors with designs that change each week

Service Commission for an additional three-month trial in order to study it further.

On May 17, 1931, a 75-cent pass was again put into effect, this time being designated as a shopper-theater pass. The same governing rules were followed as with the Christmas shoppers' pass, except that two children of half-fare age were allowed to ride free on Sundays along with the bearer. The time limit on this experiment expired on June 27 but was extended to Sept. 5, with the additional privilege that two children of half-fare age may ride with the holder at any time when the pass is good. The reason behind this was that many women of moderate circumstances in Milwaukee have small children and cannot afford to employ help to take care of the children, so they must either stay at home or take the children with them. If the regular fare were paid for two children as well as for the mother, it would make the cost too great to allow many street car rides. This new additional privilege on the off-peak pass would permit women to take children visiting or to the parks and, together with the \$1 weekly pass, it would in effect provide low-cost family transportation. Sales of the shopper-theater pass averaged about 1,800 up to the time the privilege of two children was added, and in the first week after the additional privilege was allowed, the sales went to about 2,200, with further increases as the plan became better known.

the interurban lines carried between 600 and 900 passengers after 6 p.m. from Monday to Friday of each week. After the pass was effective, the riding during the same periods reached 2,000 per day. Between 600 and 1,000 passes were sold daily, depending on the weather. Of the total riders after 6 p.m. on these days, between 500 and 800 continued to pay the regular fare.

The 50-cent summer night pass was to have expired on July 31, but was extended to Sept. 4. A special children's pass effective for the same period and with the same privilege, is being sold for 25 cents. These special summer night passes gave the company an opportunity to display its wares to get a large number of people on the interurban line accustomed to riding who otherwise would not ride.

Beginning on July 16, 1931, and effective up to Aug. 31, a 15-cent pass known as the "Pastime Pass" was made effective on the city buses of the company's de luxe bus lines operating in Milwaukee. The "Pastime Pass" supplements a 10-cent cash fare and is good for any number of rides after 6 p.m. on the day of purchase. On Sunday it is good all day and is sold at the same rate. This pass idea has proved very popular and has saved money for anyone riding more than once during the evening. Sales are in the order of 500 per night on a weekday and are a maximum on Sundays, the peak sale being slightly more than 2,000.

Trend of REVENUES and EXPENSES

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
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Boston Elevated Railway, Boston, Mass.

July, 1930.....	2,371,152	5.04	2,108,071	0.61	187,529	189.94
Aug.....	2,280,322	7.81	2,113,183	1.55	274,728	163.79
Sept.....	2,470,918	3.78	2,091,718	0.52	59,868	200.31
Oct.....	2,811,399	4.04	2,157,474	1.29	221,188	31.30
Nov.....	2,579,899	10.34	2,066,206	2.56	71,150	77.85
Dec.....	2,850,330	8.20	2,178,896	2.24	235,950	56.62
Jan., 1931.....	2,840,159	8.43	2,082,456	6.23	314,067	30.56
Feb.....	2,534,828	8.33	1,952,032	5.23	142,339	18.27
Mar.....	2,769,564	7.30	2,019,081	4.92	309,212	29.08
Apr.....	2,616,188	7.00	1,909,176	7.83	275,740	11.45
May.....	2,579,265	8.70	1,993,753	4.36	143,804	52.47
June.....	2,415,179	5.32	2,073,560	7.04	99,815	189.79
July.....	2,188,942	7.68	2,021,305	4.12	271,777	62.23

Brooklyn-Manhattan Transit System, New York, N. Y.

July, 1930.....	5,003,577	2.86	3,608,741	6.06	720,302	18.55
Aug.....	4,727,623	4.39	3,558,841	6.61	465,144	14.91
Sept.....	4,834,251	2.49	3,453,431	4.52	667,323	6.20
Oct.....	5,036,775	2.58	3,572,553	4.22	758,817	2.78
Nov.....	4,769,083	4.37	3,366,923	6.98	689,470	2.34
Dec.....	5,065,484	2.56	3,546,963	4.25	814,788	2.04
Jan., 1931.....	4,852,706	5.48	3,475,330	7.01	674,029	5.80
Feb.....	4,453,655	3.79	3,159,903	5.96	583,468	2.40
Mar.....	5,028,562	2.56	3,475,847	3.87	814,360	4.13
Apr.....	4,969,481	2.09	3,458,940	3.35	804,235	0.25
May.....	5,056,779	3.31	3,438,037	4.51	913,877	1.54
June.....	4,983,112	1.71	3,466,384	3.49	870,919	12.12
July.....	4,841,635	3.24	3,499,609	3.02	631,791	7.21

Brooklyn & Queens Transit System, New York, N. Y.

July, 1930.....	1,917,118	6.15	1,603,893	7.10	203,433	4.15
Aug.....	1,827,238	6.45	1,595,256	7.11	120,864	8.15
Sept.....	1,887,499	4.66	1,564,271	5.65	213,728	2.66
Oct.....	1,922,388	5.20	1,597,166	5.50	214,924	7.74
Nov.....	1,820,498	5.85	1,522,735	7.58	187,822	5.20
Dec.....	1,920,463	4.40	1,560,950	6.11	250,893	6.06
Jan., 1931.....	1,849,644	6.18	1,541,235	7.58	197,355	3.02
Feb.....	1,704,677	3.98	1,416,192	5.40	176,217	2.58
Mar.....	1,941,078	1.98	1,602,862	2.56	227,472	1.21
Apr.....	1,911,878	1.29	1,592,919	3.11	208,514	6.86
May.....	1,980,118	2.50	1,585,293	1.85	286,334	7.89
June.....	1,942,830	1.29	1,609,335	0.34	221,493	15.98
July.....	1,893,414	1.24	1,550,897	3.34	227,012	11.59

Capital Traction Company, Washington, D. C.

July, 1930.....	306,527	9.02	272,490	4.65	4,935	78.19
Aug.....	314,513	3.48	268,561	4.09	16,103	2.62
Sept.....	327,713	7.06	268,066	1.61	30,259	6.78
Oct.....	374,646	1.22	288,351	1.48	58,638	17.56
Nov.....	346,054	2.70	273,481	1.54	42,659	11.05
Dec.....	369,885	1.77	274,221	3.21	67,651	0.61
Jan., 1931.....	347,491	3.06	280,514	3.30	37,705	5.11
Feb.....	312,815	3.47	252,080	6.68	30,521	1.87
Mar.....	344,191	2.65	270,962	3.88	43,847	4.09
Apr.....	366,276	2.39	273,436	5.89	65,123	12.93
May.....	362,502	1.87	281,344	1.61	50,959	5.60
June.....	351,017	3.05	276,751	1.84	45,841	12.14
July.....	.....	.....	.....	.....	.....	.....

Chicago Surface Lines, Chicago, Ill.

July, 1930.....	4,535,460	10.05	3,807,075	7.10	649,307	19.05
Aug.....	4,488,146	12.20	3,796,705	8.06	680,219	15.82
Sept.....	4,568,564	9.50	3,789,472	4.40	713,323	12.94
Oct.....	4,879,570	10.79	3,933,416	7.35	799,118	11.69
Nov.....	4,537,647	13.48	3,769,538	6.86	712,177	20.77
Dec.....	4,846,000	8.09	3,984,572	9.89	767,348	15.87
Jan., 1931.....	4,576,133	12.65	3,825,964	5.97	718,129	21.00
Feb.....	4,234,704	10.90	3,665,038	6.04	601,726	15.44
Mar.....	4,584,224	4.35	4,287,237	5.84	557,167	15.05
Apr.....	4,759,624	4.46	4,092,047	0.36	675,629	11.66
May.....	4,541,847	9.88	3,802,582	4.61	724,514	12.88
June.....	4,348,896	8.76	3,629,943	5.86	580,118	10.55
July.....	4,093,702	9.74	3,579,566	5.98	.....	.....

Department of Street Railways, Detroit, Mich.

July, 1930.....	1,549,503	27.41	1,452,871	14.20	41,888	113.55
Aug.....	1,516,209	29.02	1,426,941	16.67	59,773	119.46
Sept.....	1,510,161	26.36	1,436,175	12.59	51,711	115.10
Oct.....	1,579,476	25.84	1,458,238	14.91	22,933	91.71
Nov.....	1,481,136	23.35	1,333,571	15.58	4,890	98.14
Dec.....	1,610,179	22.59	1,440,503	9.67	23,052	77.93
Jan., 1931.....	1,550,656	28.54	1,421,575	20.95	12,759	91.44
Feb.....	1,431,468	25.58	1,323,683	18.96	28,909	117.91
Mar.....	1,696,308	16.58	1,415,021	18.68	133,347	11.03
Apr.....	1,605,536	19.51	1,368,187	20.82	101,041	27.10
May.....	1,531,767	22.42	1,306,654	18.75	75,494	69.04
June.....	1,416,647	20.71	1,302,075	15.86	34,977	121.99
July.....	1,256,741	18.89	1,243,831	14.38	144,112	244.41

Eastern Massachusetts Street Railway, Boston, Mass.

July, 1930.....	617,220	10.11	461,048	7.27	3,926	91.22
Aug.....	624,332	9.42	444,429	10.53	28,399	52.01
Sept.....	612,237	7.12	448,470	0.88	21,771	70.76
Oct.....	623,872	8.48	467,773	4.92	15,811	76.73
Nov.....	590,856	10.90	449,032	1.60	205	97.62
Dec.....	670,964	11.93	516,913	1.71	20,841	84.02
Jan., 1931.....	700,961	7.63	472,079	2.88	36,145	55.16
Feb.....	639,344	6.62	434,904	2.83	33,058	50.86
Mar.....	685,614	3.63	472,317	1.53	28,982	81.83
Apr.....	617,705	5.21	434,716	2.59	9,906	78.95
May.....	629,827	5.14	450,887	0.23	23,599	52.14
June.....	622,119	0.43	447,131	2.72	5,090	82.24
July.....	602,832	2.33	459,166	0.41	24,412	721.80

*Decreases or deficits are shown by italic figures.

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$	Increase or Decrease Per Cent*
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Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

July, 1930.....	60,907	21.02	64,134	11.58	24,217	110.22
Aug.....	64,592	18.82	62,484	8.19	12,690	35.15
Sept.....	72,267	11.61	63,549	5.42	8,497	43.09
Oct.....	75,708	17.80	66,353	0.59	18,447	22.80
Nov.....	72,024	15.82	66,314	0.23	21,171	158.25
Dec.....	.....	.....	.....	.....	.....	.....
Jan., 1931.....	79,764	15.78	67,438	7.38	13,153	285.77
Feb.....	74,018	13.38	62,239	7.93	13,594	75.36
Mar.....	75,201	7.83	64,051	7.61	13,965	5.28
Apr.....	70,660	0.48	62,685	4.90	16,298	23.64
May.....	72,560	8.29	61,040	6.82	15,998	21.34
June.....	63,338	13.81	59,346	9.15	24,700	97.48
July.....	58,406	4.11	59,429	7.33	20,259	16.34

Trend of Revenues and Expenses by Months (*Concluded*)

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$	Increase or Decrease Per Cent*	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Net Income \$	Increase or Decrease Per Cent*	
Kansas City Public Service Company, Kansas City, Mo.												
July, 1930....	635,205	11.09	573,990	9.92	21,365	144.42	513,367	11.04	458,817	8.90	5,480	77.94
Aug.....	622,554	13.17	530,094	11.41	15,479	64.11	495,723	442.076	442,076	3,643	.....	.....
Sept.....	650,114	9.99	524,324	12.12	50,261	1.32	493,296	12.72	434,036	10.39	8,376	72.04
Oct.....	725,428	4.89	700,311	12.90	60,435	190.35	531,803	13.76	506,318	14.58	41,223	63.80
Nov.....	706,577	5.29	572,066	7.04	58,994	5.69	559,363	13.02	460,420	21.92	51,623	889.51
Dec.....	758,045	1.73	570,065	14.68	108,444	284.88	543,940	13.39	493,596	12.94	372	95.68
Jan., 1931....	711,215	6.52	577,741	12.67	61,108	137.10	482,566	14.30	437,444	18.02	4,503	150.71
Feb.....	640,676	6.87	537,583	9.72	27,392	149.06	524,299	10.44	480,958	9.38	6,233	265.73
Mar.....	216,637	2.58	577,319	7.25	66,013	72.81	510,645	9.59	470,964	7.60	9,996	465.60
Apr.....	709,515	0.68	563,328	6.23	71,298	99.32	509,278	10.64	474,803	7.52	16,021	168.13
May.....	701,286	2.37	562,482	7.66	64,474	114.33	482,703	9.40	438,362	8.15	4,633	201.09
June.....	655,957	0.17	540,187	6.23	42,677	683.20	.....	.....	.....	.....	.....	.....
July.....	613,628	3.19	533,084	9.23	6,643	119.18	.....	.....	.....	.....	.....	.....
Long Island Railroad, New York, N. Y.												
July, 1930....	4,018,939	5.76	2,668,042	3.56	1,180,528	11.19	1,236,414	6.91	964,582	6.24	14,358	59.85
Aug.....	3,968,936	5.21	2,635,376	5.06	1,152,651	6.69	1,198,180	8.34	831,241	18.41	6,119	71.42
Sept.....	3,589,671	7.33	2,467,056	7.07	928,655	6.58	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.....	3,371,761	5.80	2,446,346	8.97	729,067	1.77	1,354,086	7.28	1,049,306	4.84	25,163	71.16
Nov.....	2,954,624	4.20	2,249,258	14.66	483,180	89.15	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.....	2,905,045	6.60	2,130,182	16.27	596,812	47.11	1,350,553	8.19	1,043,315	7.25	36,700	64.64
Jan., 1931....	2,763,421	6.65	2,210,263	9.65	321,141	6.00	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.....	2,561,169	7.43	2,074,216	9.13	332,002	3.86	1,136,604	15.78	891,421	15.97	24,088	231.16
Mar.....	2,841,915	5.09	2,234,418	9.00	449,501	24.64	1,262,429	14.90	981,026	14.76	12,212	84.91
Apr.....	2,976,402	4.69	2,269,029	7.37	533,425	1.97	1,253,764	15.50	966,424	13.66	11,440	82.93
May.....	3,212,765	4.00	2,338,313	8.03	695,032	9.93	1,256,334	13.78	991,107	11.93	2,206	98.99
June.....	3,414,354	6.78	2,351,016	7.26	907,010	5.76	1,195,126	10.29	963,857	7.59	34,962	198.96
July.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Market Street Railway, San Francisco, Cal.												
July, 1930....	735,453	5.87	649,901	1.68	32,534	46.39	.....	.....	.....	.....	.....	.....
Aug.....	770,284	6.69	643,287	5.46	72,923	16.56	.....	.....	.....	.....	.....	.....
Sept.....	745,298	5.35	626,770	3.74	64,731	16.38	.....	.....	.....	.....	.....	.....
Oct.....	786,012	6.73	675,908	6.49	57,384	5.58	.....	.....	.....	.....	.....	.....
Nov.....	729,407	8.81	615,613	8.18	60,457	29.25	.....	.....	.....	.....	.....	.....
Dec.....	773,508	6.12	639,249	6.62	83,460	0.03	.....	.....	.....	.....	.....	.....
Jan., 1931....	738,092	5.55	641,519	4.83	45,011	12.31	.....	.....	.....	.....	.....	.....
Feb.....	668,931	8.17	576,661	8.22	41,002	7.29	559,758	.....	.....	57,690	12,669	.....
Mar.....	757,960	6.40	633,346	6.81	72,828	0.05	600,960	.....	.....	86,091	14,449	.....
Apr.....	745,252	6.72	620,106	7.06	73,837	3.46	1,233,292	891,133	.....	.....	.....	.....
May.....	733,105	7.50	619,934	8.21	62,805	2.08	1,159,759	785,945	.....	373,814	.....	.....
June.....	704,769	5.19	654,225	1.75	37,384	11.62	1,233,292	891,133	.....	342,159	.....	.....
July.....	700,996	4.68	598,082	7.97	52,186	60.40	1,159,759	785,945	.....	4,698,457	.....	.....
New York, Westchester & Boston Railway, New York, N. Y.												
July, 1930....	224,469	5.89	146,233	6.00	162,653	5.38	1,236,414	6.91	964,582	6.24	14,358	59.85
Aug.....	196,405	10.53	152,180	0.41	184,982	22.45	1,198,180	8.34	831,241	18.41	6,119	71.42
Sept.....	203,617	8.18	165,256	6.57	192,861	29.53	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.....	202,046	7.62	138,192	14.09	190,748	80.81	1,354,086	7.28	1,049,306	4.84	25,163	71.16
Nov.....	184,690	8.74	170,542	2.52	216,451	19.75	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.....	190,136	12.31	138,592	17.80	205,029	16.75	1,350,553	8.19	1,043,315	7.25	36,700	64.64
Jan., 1931....	182,249	13.76	160,800	9.44	220,394	32.37	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.....	161,311	15.02	149,571	11.18	222,308	29.42	1,136,604	15.78	891,421	15.97	24,088	231.16
Mar.....	181,729	12.80	144,442	3.54	195,302	24.31	1,262,429	14.90	981,026	14.76	12,212	84.91
Apr.....	186,708	15.03	142,832	0.31	189,142	19.00	1,253,764	15.50	966,424	13.66	11,440	82.93
May.....	195,905	15.11	149,268	0.42	186,389	25.70	1,256,334	13.78	991,107	11.93	2,206	98.99
June.....	193,820	14.62	142,600	3.45	183,007	23.70	1,195,126	10.29	963,857	7.59	34,962	198.96
July.....	195,461	12.92	.....	.....	188,581	23.55	.....	.....	.....	.....	.....	.....
Northwestern Pacific Railroad, Sausalito, Cal.												
July, 1930....	597,419	2.64	392,575	18.62	195,195	55.38	.....	.....	.....	.....	.....	.....
Aug.....	638,476	11.48	415,502	18.64	210,115	4.03	26,127	60.73	59,728	41,926	17,802	1,425
Sept.....	548,282	8.68	471,657	5.78	16,471	83.67	1,241,334	1,270,545a	.....	.....	15,248	5,832
Oct.....	555,867	18.49	534,858	4.44	7,447	95.22	1,678,326	1,415,836a	.....	.....	286,529	.....
Nov.....	333,193	27.74	421,717	16.33	97,567	120.85	1,263,811	10.26	983,047	7.40	108,164	.....
Dec.....	312,319	20.77	465,220	3.46	158,491	74.63	208,287	1,868,546a	.....	.....	222,277	91,061c
Jan., 1931....	283,852	21.78	401,656	14.11	123,928	14.76	208,287	1,868,546a	.....	.....	453,794	137,907c
Feb.....	273,818	27.40	387,512	12.96	122,531	68.87	208,287	1,868,546a	.....	.....	166,662	41,421
Mar.....	308,466	24.17	408,068	14.43	109,855	48.81	208,287	1,868,546a	.....	.....	129,795	42,295
Apr.....	322,742	25.66	402,400	16.65	88,300	58.51	208,287	1,868,546a	.....	.....	240,566	82,264c
May.....	346,743	28.51	362,722	24.85	28,886	931.64	208,287	1,868,546a	.....	.....	222,277	91,061c
June.....	380,604	24.60	368,559	17.82	1,970	95.39	208,287	1,868,546a	.....	.....	453,794	137,907c
July.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
State Island Rapid Transit Company, New York, N. Y.												
July, 1930....	243,991	9.78	189,173	39.19	41,021	34.99	1,236,414	6.91	964,582	6.24	14,358	59.85
Aug.....	233,371	13.92	168,110	11.19	49,486	35.97	1,261,734	6.71	995,805	5.02	10,050	75.81
Sept.....	206,908	16.93	165,525	4.87	26,127	60.73	1,354,086	7.28	1,049,306	4.84	25,163	71.16
Oct.....	205,631	10.58	167,586	6.49	29,723	26.11	1,263,811	10.26	983,047	7.40	9,200	87.30
Nov.....	178,652	17.42	161,608	0.58	10,788	80.37	1,350,553	8.19	1,043,315	7.25	36,700	64.64
Dec.....	178,474	9.08	160,715	47.29	5,997	92.85	1,268,536	10.90	994,411	11.89	7,388	69.22
Jan., 1931....	170,387	9.68	158,982	6.35	1,448	114.6	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.....	161,415	13.58	142,565	9.20	2,151	93.49	1,268,536	10.90	994,411	11.89	7,388	69.22
Mar.....	173,723	7.98	159,035	7.78	1,164	81.24	1,268,536	10.90	994,411	11.89	7,388	69.22
Apr.....	176,863	10.78	147,210	13.23	23,169	51.91	1,268,536	10.90	994,411	11.89	7,388	69.22
May.....	188,151	11.61	163,148	7.61	9,268	63.19	1,268,536	10.90	994,411	11.89	7,38	



1931 WINNERS

Individual Awards Made in MAINTENANCE CONTEST

1—W. J. McCallum, foreman frog shop, Toronto Transportation Commission, for his article "Switch Recess Grinder." Capital prize of \$100 for best article submitted during the entire contest and \$25 prize in way and structures department for the first period.

2—Farrell Tipton, San Diego Electric Railway, for his article "Buffer Refinishes Armature Cores," \$25 prize in rolling stock and shops department for first period.

For his article "Frame for Testing all Sizes of Bus Starters and Generators," \$25 prize in bus and garage department for second period.

For his article "Adjustable Vise for Bus Generators," \$25 prize in bus and garage department for third period.

3—M. B. Schwegler, Toronto Transportation Commission, for his article "Long Graphic Charts Read with Ease," \$25 prize in electric and line department for first period.

4—C. B. Hall, Virginia Electric & Power Company, for his article "Bus Wheels Removed with a Simple Clamp," \$25 prize in bus and garage department for first period.

5—John C. Burdett, Georgia Power Company, for his article "Emergency Sash for Broken Car Windows," \$25 prize in rolling stock and shops department for second period.

6—F. W. Drowley, Toronto Transportation Commission, for his article "Depressing Rail Lips at Track Drains," \$25 prize in way and structures department for second period.

AT A MEETING of judges of ELECTRIC RAILWAY JOURNAL Maintenance Contest, held at American Electric Railway Association Headquarters in New York on Aug. 7, prize winners for the third period were selected as well as the winner of the \$100 capital prize for the best article submitted during the year.

In the department of rolling stock and shops, the prize for the third period goes to Walter R. McRae, Toronto Transportation Commission, for his article "Bumper Straightener." In the department of way and structures, the winner is M. W. Wales, Winnipeg Electric Company, who submitted an article "Positive Acting Mechanism for Track Switches." H. A. Brown, Cleveland Railway, is the winner in the electric and line department with his article "Heater for Headway Recorders." In the bus and garage department, the prize goes to Farrell Tipton, San Diego Electric Railway, for his article "Adjustable Vise for Bus Generators."

After careful consideration, the judges selected for the capital prize the article "Switch Recess Grinder," submitted by W. J. McCallum, foreman frog shop, Toronto Transportation Commission. This article, which won the prize for the first period in the way and structures department, was published in the March issue of the JOURNAL, page 152.

At the same time the judges examined the data submitted by a large number of electric railways for the company award in the Maintenance Contest. The decision in this part of the contest will be announced during the sessions of the American Electric Railway Engineering Association, at the Atlantic City Convention in September. Presentation of the silver plaque will be made at the same time.

7—Grayson S. Evans, Pittsburgh Railways, for his article "Improved Current Selective Relay for Track Switches," \$25 prize in electric and line department for second period.

8—Walter R. McRae, Toronto Transportation Commission, for his article "Bumper Straightener," \$25 prize in rolling stock and shops department for third period.

9—M. W. Wales, Winnipeg Electric Company, for his article "Positive Acting Mechanism for Track Switches," \$25 prize in way and structures department for third period.

Mr. Wales appears among the prize winners for the first time on this occasion. He was born in Elkhorn, Wis., Dec. 25, 1883. He attended public and high school there, being graduated in 1903. Then he went to New York and studied at the Webb Institute, from which he was graduated in 1907. His first job was with the Pennsylvania Railroad. After that he was engaged in a variety of engineering work, but did not return to the transportation field until January, 1923, when he joined the Winnipeg Electric Company as engineer of ways and structures.

10—H. A. Brown, Cleveland Railway, for his article "Heater for Headway Recorder," \$25 prize in electric and line department for third period.

Mr. Brown, another new prize winner, entered the employ of the Cleveland Railway in 1911 as a bonder's helper. Since then he has held the positions of bonder, electric track switch maintenance man, assistant foreman, and foreman of the return circuit division. His studies in connection with electric track switches have been largely responsible for the highly efficient mechanism used on this property. All the automatic block signals on the Van Sweringen Shaker Heights rapid transit line were installed under his direction. He holds several patents on important pieces of electric track switch equipment.

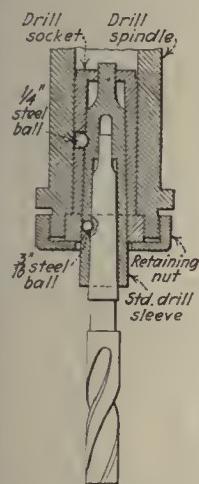
PRACTICAL IDEAS for the

Maintenance Man

Drill and Sleeve Fastened to the Boring Machine*

By W. J. McCALLUM

Foreman Frog Shop
Toronto Transportation Commission



Steel balls fix the drill and sleeve to the socket

WHEN boring screw spike holes in hardwood ties considerable difficulty has been experienced in withdrawing the drill from the tie. The drill usually jams in the hardwood tie and pulls out of the boring machine. To overcome this trouble, holes are drilled in the sleeve and socket in the manner shown in the illustration. Steel balls are inserted and are held in place by peening the edges of the holes, partly fitting in the recesses which are drilled or ground in the drill and in the sleeve. In assembling, the drill is inserted in the sleeve, the sleeve in the socket, and finally the socket is fastened in the spindle.

is then raised or lowered to center with the coupling. The generator is connected by leads to a test panel, which demonstrates its performance at the various speeds at which it is driven.

The adjustable vise is made from an old compound tool rest, and the driving unit is a 600-volt shunt motor, with a variable resistance for speed regulation. A double-pole, double-throw switch in the armature circuit controls the direction of rotation. Five sizes of universal couplings are available for the different types of generators. The keyways are machined in each coupler to correspond with each type of generator shaft. A disk is inserted in the coupling to act as a means of centering the generator and motor, and also to overcome most of the friction between the motor and generator. The shoulders on the opposite sides of the disk are at right angles to each other to prevent the disks from coming out from the coupling while in rotation.

Positive Acting Mechanism for Track Switches*

By M. W. WALES

Engineer of Way and Structures
Winnipeg Electric Company, Winnipeg, Canada

Adjustable Vise for Bus Generators*

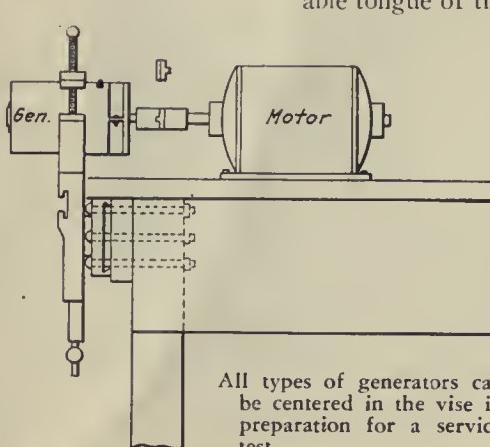
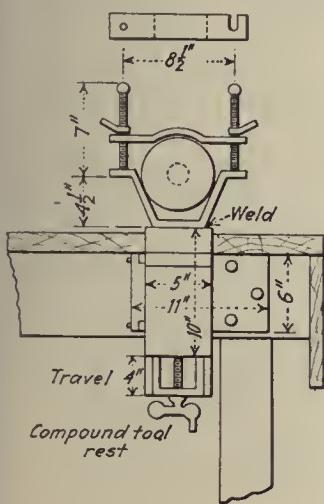
By FARRELL TIPTON

Electrician
San Diego Electric Railway

GENERATORS for buses of the San Diego Electric Railway are given a service test after repairs have been made. This is done by placing the generator in an adjustable vise, and connecting the shaft with that of the driving motor with a universal coupling. The vise

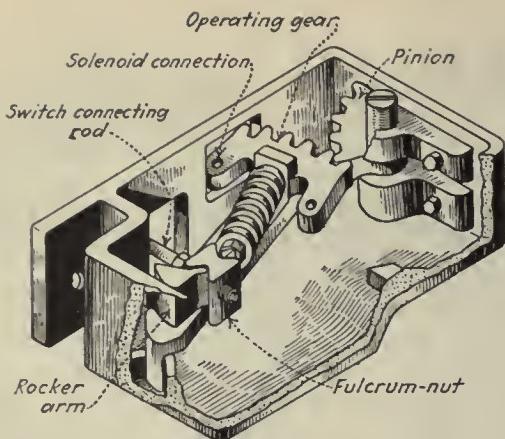
PREVENTION of split switches is the object of a mechanism developed by the Winnipeg Electric Company for operating and holding in position track switches while cars are passing through them. This object has been attained by designing the mechanism to operate in a manner exactly the reverse of that of existing types. The mechanism is operated by hand or electricity, and in turn it operates the switch, thus setting and holding the switch in positive position. Any movement of the switch does not shift the setting of the holding mechanism. It acts as a spring switch in both positions, and also permits trailing.

To operate the switch, or change the setting of the movable tongue of the switch to the opposite setting, a switch iron is inserted in the slot and then turned to the left. This starts the pinion, which, in turn, moves the gear to the opposite side of the switch box. As shown in the illustration, the gear is attached to the pivoted arm carrying one end of the spring, and when it begins to move, it changes the direction and force of the spring and causes the fulcrum nut, which carries the other end of the spring, to move. The switch tongue is then thrown by the connecting rod.



All types of generators can be centered in the vise in preparation for a service test

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



Non-split operating and holding mechanism for track switches developed by the Winnipeg Electric Company

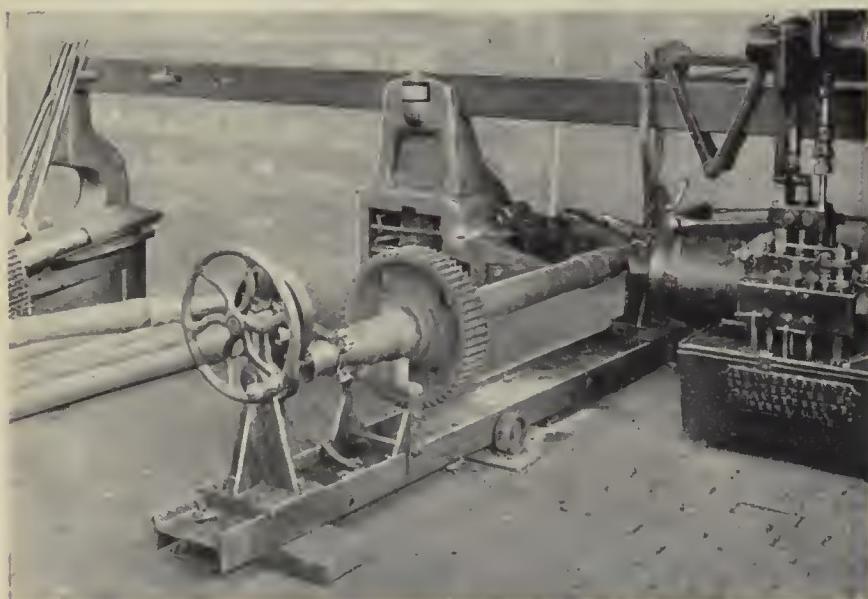
The movement on the fulcrum nut is kept in a straight line by the rocker arm which is between the fulcrum nut and the side of the switch box. This arm is so designed that, in either set position of the mechanism, the interior angle between the intersecting lines of force from the spring, and the reaction from the side of the box through the rocker arm is less than 180 deg. Suitable connections have been designed for both the Cheatham and Collins solenoids, and we are now using the mechanism with both types for electric operation.

Straightening Axles in the Wheel Press*

BY TERANCE SCULLIN

*Superintendent of Equipment and Buildings
Cleveland Railway*

STRAIGHTENING of axles at the Harvard shops of the Cleveland Railway is now being done by a device that has proved very efficient. It consists of a bed carrying a stationary and a threaded center, between which the axle to be straightened is supported. The whole apparatus is mounted on two wheels to facilitate



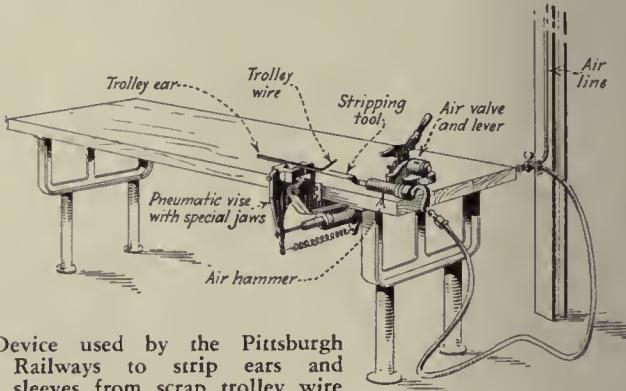
This testing device which holds the axle while being straightened in the wheel press was designed in the Cleveland Railway shops

movement. At the stationary center end, gears and a hand wheel are arranged to spin the axle so that its bent sections may be located. A special casting for holding two jaws is bolted to the wheel-press yoke. The bent portion is then centered between the two stationary jaws and the pressure arm of the wheel press. The pressure is varied according to the amount the axle is bent. The axle is then tested for trueness by spinning, and the process is repeated until the axle is found to be true. Axles can be straightened easily and accurately by means of this method.

Reclamation and Disposal of Overhead Lines Scrap*

By R. J. RUSSELL
Pittsburgh Railways

ALL overhead lines scrap, such as trolley wire, trolley wire fittings, cable, etc., was formerly sent to the stores department for sorting and disposal. A new method has been inaugurated whereby all trolley wire scrap and fittings are hauled to the central quarters of



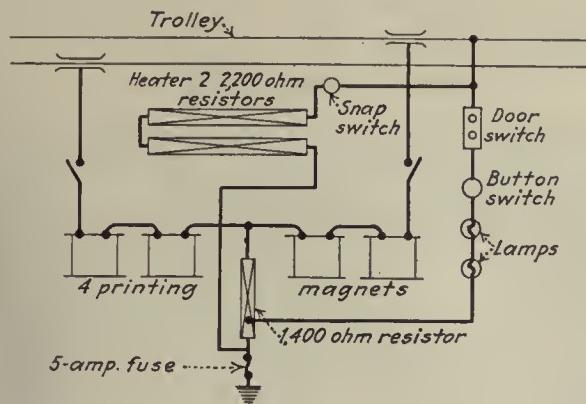
Device used by the Pittsburgh Railways to strip ears and sleeves from scrap trolley wire

the overhead lines department for inspection and reclamation, and all insulated wire and cable scrap is hauled to the stores department where the insulation is burned in the incinerator and then the copper is sold in bulk. When the scrap is taken to the central quarters all line ears and splicing sleeves are stripped from the trolley wire. To facilitate this work an air vise was purchased and was fitted with jaws designed to hold ears and sleeves firmly. An air hammer with a stripping needle is used to strip them from the wire.

After the ears and sleeves are removed from the wire they are inspected, and those that are not completely worn are put back in service. Formerly the ears and sleeves were merely cut out and sold assembled with the inclosed length of trolley wire. They were then classed and sold as unclean brass. Now, the trolley wire is removed from all ears and sleeves, and they are classed and sold as clean brass, and consequently have a higher market value. Considering the value of the

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

salvaged fittings put back in service, the better prices received for clean brass and cable with the insulation burned off, we estimate our savings to be approximately \$6,000 to \$7,000 per year.



Resistors are installed in headway recorders to maintain a suitable temperature throughout the year

Heater for Headway Recorder*

By H. A. BROWN
Switch & Signal Division
Cleveland Railway

LOSS of time in the Nachod headway recorder clocks during the winter months has caused considerable trouble on the Cleveland Railway. To overcome this defect, heaters were installed in each recorder box to maintain approximately summer temperature under the most severe weather conditions.

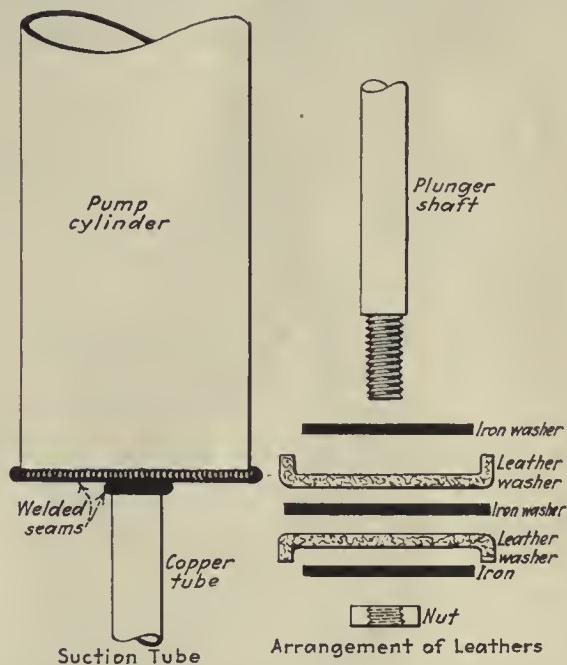
This heater consists of two 2,200-ohm resistors connected in series. It is mounted on a slate base underneath the rounded top of the case, where it is out of the way of other equipment. The resistors are connected to the power source through a small snap switch, as shown in the illustration, so that they may be turned off when not needed.

exterminating weeds. Six special nozzles throw a cone spray that completely covers the ballasted section of the track, while two additional hose connections can be used to spray the right-of-way on either side of the track.

Removing Water from Switch Boxes*

By NORMAN H. RAYNER
San Diego Electric Railway

BAILING of water from the boxes of electric track switches of the San Diego Electric Railway is accomplished effectively with an automobile pump. An old pump can be easily adapted for this purpose. An extra leather washer is placed in the plunger of the pump, as shown in the illustration, to obtain the needed suction to draw water. The base of the pump is replaced by a sheet-iron disk with a $\frac{5}{16}$ -in. hole, which is welded



Automobile pump fitted to bail water from boxes of electric track switches

Weed Destroyer Used on Chicago Rapid Transit Lines

CO-OPERATING with several communities in their "clean-up" efforts, the Chicago Rapid Transit Company is using a weed destroyer on its surface tracks in Chicago and its suburbs. The roadbed on the west and northwest branches of the "L" has been treated, and other lines will be treated in the near future.

The new device, mounted on a flat-car, consists of a huge tank to which is connected a distributing system for spraying an acid solution effective in



Tank car used by Chicago Rapid Transit Company for spraying acid solution to kill weeds along its right-of-way

to the pump cylinder. A piece of copper tubing, about 10 in. long, is inserted in the hole of the disk just far enough so that it will not come in contact with the end of the plunger shaft. The tube is also welded to the disk. By pulling the plunger to the top of the cylinder, water will be drawn into the cylinder, and it can be emptied again by pushing the plunger down.

Armature Shaft Practices

By JOHN S. DEAN

Renewal Parts Engineer
Westinghouse Electric & Manufacturing Company

MANY motor failures can be traced to homemade shafts turned down from worn out and discarded armature shafts and car axles, which have, without doubt, been previously stressed in service. Shafts of many of the older types of railway motors were made from axle steel. The present trend is to use shafts of axle or special alloy steel, heat-treated. Where severe operating conditions cause excessive shaft breakage it is advisable to use the better grades of steel for shaft renewals. The accompanying tabulation shows that the average yield point of the heat-treated axle steel is 44 per cent higher than the same material untreated; while the heat-treated alloy steel is 77 per cent higher.

Experience indicates that armature shaft troubles are mostly due to one or more of the following causes: broken shafts, bent shafts, worn journals, damaged pinion key seats and worn pinion fits. Bent shafts can generally be straightened without removal from the armature core. The armature is rotated in a lathe to check pinion and commutator ends for eccentricity with a Bath indicator or similar device. Shafts should not be more than 0.004 to 0.006 in. out of true when put back in service.

Shaft breaks occur principally where the pinion end leaves the spider or core, or at the end of the pinion seat. Broken shafts should be replaced; under no conditions should they be repaired by welding. The expense incurred and possibility of further failure makes welding of shafts unprofitable.

In replacing armature shafts, the following points should be observed:

1. Place fillets at all changes in diameter on new shafts.
2. Make press fits for new shafts 0.001 to 0.002 in. larger than the original shaft to insure the proper force when pressing them in the core.
3. Check bore of the spider.
4. Brush white lead on the shaft at the fits to act as a lubricant and to prevent rusting.
5. Check clearance between the top of the key and the key seat in the core to prevent binding.
6. Chamfer the start of the bore to allow the shaft to enter easily.
7. Maintain the shaft level when pressing it into the core.
8. Press in shafts at 15 to 25 tons on motors ranging from 25 to 50 hp., and at 40 to 50 tons for sizes above 50 hp.
9. Press out shafts at 1.5 to 2 times the force used when they are pressed in.

Characteristics of Steel for Armature Shafts

	Ultimate Strength, Lb.	Yield Point, Lb.	Elongation Per Cent	Reduction in Area, Per Cent
Special axle steel, guaranteed....	75,000	40,000	18	30
Special axle steel, average.....	85,000	45,000	20	35
Special axle steel, heat treated—guaranteed.....	80,000	50,000	18	50
Average.....	105,000	65,000	23	55
Alloy steel, heat treated—guaranteed.....	100,000	65,000	20	45
Average.....	117,000	80,000	24	50

10. Vary the press fit with the metal of the core and use of keys. Steel or malleable iron shafts, or those without keys can safely stand a higher pressure than cast iron.

Early railway motors had laminated cores built up directly on the shaft, with core keys to align the punchings. The spider construction was adopted in later designs, having a key between core and spider, and another between spider and shaft. In recent years the key between spider and shaft had been omitted. Shaft keys of modern motors are the full depth rounded-end type. These are preferred to the old "sled runner" or full depth tapered end key, which sometimes slipped out of place when the shaft was pressed into the core, or when the pinion was driven on the shaft.

TEMPORARY REPAIRS SHOULD BE USED ONLY AS EMERGENCY PRACTICE

When key seats on pinions are damaged they may be repaired with a special offset key; if this is not possible a new key seat should be cut opposite the old one. Pinion fits sometimes become worn and slightly undersize, allowing the pinion to ride up too far on the taper. A liner of strong paper or of sheet metal fitted over the taper will make the fit tight and will hold the pinion at the proper point on the taper. This procedure should be used only in an emergency and only until the damaged shaft can be replaced. Usually damage to pinion key seats and worn pinion seats on the shafts is due to loose pinions. This trouble can be reduced by heating the pinions in an oven at a temperature of from 100 to 150 deg. C., depending upon the size of the motors, before driving them on the shaft. The pinions should be driven on with copper bar weighing 8 to 10 lb. After the pinion is in place, the pinion nut and lock washer should be screwed tightly with a wrench.

The bearing surfaces on the shafts tend to wear either tapered or hollow. Some railways have five different journal sizes varying by $\frac{1}{32}$ in., to which the worn shafts are machined. Armature bearings of corresponding sizes are kept in stock. Other railways weld the journal fit and turn it to its original size. This practice, however, tends to weaken the steel and is not recommended. A canvass indicates that a large majority of the railways turn down their worn journal fits and used undersized bearings. After the bearing seat diameters of the shafts have been reduced approximately $\frac{1}{8}$ in. the shafts are discarded.

COMPANY AWARD

in Electric Railway Journal

Maintenance Contest

will be made at the convention at Atlantic City, during the Monday session of the Engineering Association

NEW PRODUCTS

for the Railways' Use



The streamline effect and arrangement of doors and wheelhousings give the new Osgood Bradley trolley bus a pleasing appearance



Driver's compartment showing control pedals and equipment cabinet

Osgood Bradley Introduces a Trolley Bus

MAXIMUM comfort, convenience and safety for the patrons are featured in a new trolley bus just announced by the Osgood Bradley Car Corporation, Worcester, Mass. Other features are the insulation of stanchions, grab handles and electrical equipment to eliminate any danger of the vehicle becoming charged and shocking passengers, a back-to-back cross-seat arrangement over the rear wheelhousings, and the reduction of noise by insulating or cushioning the trolley base, air compressor and rear control cabinet. Although the vehicle as illustrated has a rear exit door, and a seating capacity of 42 passengers, the manufacturer offers an optional center-exit design, with a seating capacity of 40. The vehicle is of the single-end, four-wheel type, arranged for one-man operation. The body and underframe are built as subassemblies, and are finally assembled as one complete unit in which all vertical loads are borne by the full height of the side frame.

The two 50-hp. motors are controlled by an automatic acceleration, foot-operated master controller under the toe board, being the unit switches in the rear. Four-wheel air brakes are provided. The vehicle has a double-width passageway at the front, controlled by pneumatic door equip-

ment. A rear exit treadle-operated door also is provided. The vehicle's length over bumpers is 32 ft. 2 in., its width over all does not exceed 96 in., and the wheelbase is 190 in. Seats are of the semi-bucket type, with single-deck cushions and concave padded backs. They are upholstered in brown machine-buffed monkey grain leather. To conserve space, the transverse seats at the rear wheels are arranged back-to-back.

At the rear of the bus, a double treadle is provided, care being taken in the installation to protect the electrical portion from moisture.

All grab handles and stanchions at exit or entrance passageways are covered with micarta tubing.

Mudguards of molded rubber with canvas insert are provided at each wheelhousing. Splash aprons also are installed at front, rear and inside of all housings. As a further precaution to prevent the splash from the roadway wetting the wooden floor a lead sheathing has been placed underneath the entire body floor.

All longitudinal runs of power and control cable have been carried in an aluminum cable box inside of the car body under the window sill. No taps have been made for these cables either under the body or in the cable box, all cables being carried direct between the various parts of equipment. At such points as required, conductors are carried through the floor in rigid metal conduits, having fittings with porcelain covers. All electrical equipment underneath the bus, except propulsion motors, is doubly insulated from the bus framing.



Leather upholstered seats, thermostatically controlled electric heaters, ample lighting and convenient arrangement of seats are provided in the interior

To reduce the noise of the controller switches, the rear cabinet for housing this equipment is insulated by Celotex and a lining of asbestos. Trolley poles are provided with rubber insulation and the trolley bases are so mounted that trolley hum in the roof is prevented. Choke coils

having suitable characteristics are installed on the roof in both sides of the trolley circuit to eliminate radio interference. As quietness of the air compressor is essential, this unit is supported through a cushioning of rubber and electrical insulation. Heavy supports minimize vibration.

opening on the top of the radiator housing provides ample heating for the front end.

Mather chrome-vanadium springs are used. These are 56 in. long and 3 in. wide, both front and rear. They are mounted to the main frame members to obtain equal distribution of weight, and are fastened to the axles with heat-treated non-stretching U bolts of $\frac{3}{4}$ -in. diameter.

The front axle is the heavy-duty I-beam type, developed by Timken for the Twin Coach, with 78-in. tread. The rear axle is the full-floating type, with differential bevel gear drive. The axle shaft is $1\frac{3}{4}$ in. Both front and rear axles are equipped with interchangeable heavy-duty brakeshoes angled on a $1\frac{1}{4}$ -in. brakeshoe hinge pin with a Westinghouse operating cam, slack adjuster and 7-in. diaphragm. The total braking area is 350 sq.in. The shoes are lined with American Brake Blok full coverage blocks. Brake drums are of Allyne Ryan gun iron. Air for actuating the brakes is supplied by a Westinghouse 3-cu.ft. air compressor, driven by dual belts off the front end of the crank shaft.

The Hercules engine, which is identical with those in the larger buses of the same make, is a 6-cylinder model with $4\frac{1}{2}$ -in. bore and $4\frac{1}{2}$ -in. stroke. The piston displacement is 360.8 cu.in., the developed horsepower being 83 at 2,400 r.p.m. Additional details appear below.

One of the small-capacity buses developed by Twin Coach

MANY innovations are included in the 50 small-capacity buses, a part of the order of the Brooklyn Bus Corporation, subsidiary of the Brooklyn-Manhattan Transit Corporation, for service on the recently authorized bus lines in Brooklyn. The buses, which were ordered from the Twin Coach Corporation, will seat 27 passengers as compared with 40 for the standard Twin Coach. Although changes have been necessary on account of the reduced size, the general construction is similar to that of the large bus, except that the new one has only one engine, which is of the same rating as one of the engines for the large bus, and is interchangeable with them. Many standard parts from the larger model are used, affording interchangeability.

The main body framing is built up on two full length longitudinal 6-in. 8-lb. steel channels, specially formed. To these are mounted spring shackle bars and brackets, and across them are gusseted and riveted five $2 \times 2\frac{1}{2}$ -in. pressed-steel Z-bars, forming a support for the lower body rail and wheelbase angles, to which, in turn, are riveted the side and end posts.

Side posts and carlines are bent from one continuous piece of $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$ -in. T, covered on the sides with 14-gage duralumin panels. The roof

is of 14-gage duralumin. Joints in the body and roof are treated to retard rust, and are sealed with dum-dum. The ceiling is paneled with aluminum fastened to wood blocking, and standard-sized card racks are placed on each side. The lower body sides and ends are covered with $\frac{5}{8}$ -in. Masonite fiber panels cemented to $\frac{1}{4}$ -in. felt wadding and held in place by quickly removable pilaster brackets.

As in the larger bus, the entrance is ahead of the front wheels, and the exit behind the rear wheels. Both openings are 25 in. clear. When the vehicle is empty, the first step height is 16 in. from the ground, and the height from the step well to the floor is $12\frac{1}{2}$ in., making the floor height $28\frac{1}{2}$ in. The doors are of the four-leaf folding type, operated by National Pneumatic engines.

The seating arrangement adopted calls for five 34-in. transverse seats on the left side and one double side seat over the front wheelhousing. Four double cross seats are on the right side, with a single side seat over the front wheelhousing and a double side seat over the rear wheelhousing.

Heating is by means of a Kysor heating system, developed for the small Twin Coach, forcing hot air through two heater units mounted in the floor under the seats. A small

Weight, total.....	10,600 lb.
Length over body.....	21 ft. $3\frac{1}{4}$ in.
Length over bumpers.....	22 ft. $10\frac{1}{2}$ in.
Wheelbase.....	140 in.
Width over all.....	7 ft. $11\frac{1}{4}$ in.
Height over all, loaded.....	8 ft. $4\frac{1}{2}$ in.
Turning radius.....	29 ft.
Window post spacing.....	32 in.
Body.....	All steel
Roof.....	Arch
Doors.....	End
Air brakes.....	Westinghouse
Axles.....	Timken
Car signal system.....	Delco buzzer
Clutch.....	Brown-Lipe
Destination signs.....	Hunter illuminated
Door mechanism.....	National Pneumatic
Doors.....	Folding, four leaf
Drive shaft.....	Cleveland Steel Products
Floor covering.....	Battleship linoleum
Glass.....	Plate; ends non-shatterable
Hand brakes.....	Twin Coach standard
Heat insulating material.....	Masonite, felt backed
Heaters.....	Kysor hot air
Headlights.....	Two Guide "Tilt-ray"
Headlining.....	Aluminum
Ignition.....	Delco
Lamp fixtures.....	Guide, dome type
Lubrication.....	Alemite
Motors.....	Hercules, 6 cylinder
Painting system.....	Arcozon
Radiator.....	Long
Roof material.....	Duralumin
Sash fixtures.....	Adams-Westlake
Seats.....	Twin Coach street car type
Seating material.....	Brown leather
Springs.....	Mather chrome-vanadium
Steering gear.....	Ross cam and lever
Steps.....	Stationary
Step treads.....	Non-skid steel
Tires.....	Medium pressure balloon
Transmission.....	front 9.00-18 single, rear 7.50-20
Ventilators.....	Brown-Lipe
Wheels.....	Nichols-Lintern
Wiring.....	Cast steel spokes
	Packard cable in wiremold loom

A.E.R.A. Announces

CONVENTION PROGRAM

C ELEBRATING its golden anniversary, the 50th annual convention of the American Electric Railway Association will be held Saturday, Sept. 26, to Friday noon, Oct. 2, inclusive, in the Atlantic City Auditorium. According to the tentative program just announced by the general secretary, G. C. Hecker, joint sessions of the American Association and the affiliated associations will be held on Monday, Wednesday and Thursday mornings. The Advisory Council session will be held on Tuesday evening. The Engineering Association will hold its opening general session on Monday afternoon and its divisional meetings on Tuesday and Wednesday afternoons. The Accountants' Association and Claims Association will hold sessions on Tuesday and Wednesday afternoons. The Tuesday session of the Claims Association will be preceded by a luncheon at 12:45 p.m. The Transportation & Traffic Association will hold sessions

on Monday and Tuesday afternoons.

Luncheon conferences, to be held each day at 12:45, are designed to furnish an opportunity for delegates to obtain first-hand reports of the progress being made by various properties in solving some of the more important problems with which practically every company is faced. Opportunity will be afforded delegates to ask questions and to discuss the various conference topics.

Approximately 150 interesting and instructive exhibits of manufacturers will occupy nearly 80,000 sq.ft. of space in the Auditorium. The exhibit will open at noon on Saturday, Sept. 26, and will be open each day during the convention from 9 a.m. to 6 p.m. The exhibit will close at noon on Friday, Oct. 2. Tuesday morning, Thursday afternoon and Friday morning have been set aside for exhibit inspection only. No meetings of any of the associations will be held at those times.

"The Public Relations of Transportation," by Francis X. Busch, Chicago, Ill.

Organization and Purposes of the Electric Railway Presidents' Conference Committee—Dr. Thomas Conway, Jr., Philadelphia, Pa.

"Progress Towards Improving the Street Car," by C. F. Hirshfeld, Detroit, Mich.

Thursday, Oct. 1, 10 a.m.

Subject of the Day—Stability and Expansion Depend on Research and Co-ordination.

Award—Electric Traction Speed Contest—T. Fitzgerald, Pittsburgh, Pa.

Award—Anthony N. Brady Safety Contest—Lewis Gawtry, New York, N. Y.

"Economics of Electric Railway Operations" (based on work of T. & T. Committee on Operating Economics), by Joe R. Ong, Cincinnati, Ohio.

"Determining Relative Economics of Public Transportation Vehicles" (based on work of Engineering Committee on Economics of Rolling Stock Application), by James W. Welsh, New York, N. Y.

"Costs and Competition in Street Use" (based on work of American Committee on Street Traffic Economics), by E. J. McIlraith, Chicago, Ill.

"Determining the Relation Between Patronage and Price" (based on work of American Committee on Fare Structures), by Leslie Vickers, New York, N. Y.

Report of Managing Director Charles Gordon.

Report—Committee on Resolutions. Installation of Officers.

Accountants' Sessions

Tuesday, Sept. 29, 2:30 p.m.

Address of President.

Report of Executive Committee.

Report of Secretary-Treasurer.

Report—Representative of Accountants' Association at the Annual Convention of the National Association of Railroad and Utilities Commissioners—W. L. Davis, Allentown, Pa.

Report—Committee on Standard Classification of Accounts—M. W. Glover, Pittsburgh, Pa.

Report—Sub-Committee on Bus Accounting—E. A. Tuson, Newark, N. J.

Report—Committee on Budgetary Control—R. Gilman Smith, New York, N. Y.

Report—Committee on Nominations—Edwin H. Reed, Chicago, Ill.

Election of Officers.

Wednesday, Sept. 30, 2:30 p.m.

Report—Committee on Fare Collections—J. D. Evans, St. Louis, Mo.

Address—"Cost of Fare Collections," by C. W. Stocks, New York, N. Y.

Report—Committee on Property Records—C. R. Mahan, Chicago, Ill.

Address—"Allocation of Capital and Operating Costs to Lines," by I. O. Mall, New Orleans, La.

Report—Committee on Resolutions.

Installation of Officers.

Presentation of Past-President's Badge. New Business.

General Sessions

American, Accountants', Claims, Engineering, Transportation and Traffic

GENERAL THEME

Prospects for Public Transportation in a Motor Age

Monday, Sept. 28, 10 a.m.

Subject of the Day—Transportation Service of Growing Civic Importance.

Address of Welcome.

Address of President—"50 Years of Service and Readjustment," by J. H. Hanna, Washington, D. C.

"Accessibility a Major Factor in Urban Property Value," by Joseph P. Day, New York, N. Y.

"Keeping Open the Arteries of Trade and Commerce," by Merle Thorpe, Washington, D. C.

Report—Committee on National Relations—C. D. Cass, Washington, D. C.

ADVISORY COUNCIL SESSION

Tuesday, Sept. 29, 8:30 p.m.

Organ Recital.

Address of the Chairman—J. N. Shannahon, Omaha, Neb.

Baritone solo—Albert A. Wiederhold.

Presentation Charles A. Coffin Foundation Award, by President J. H. Hanna.

Baritone solo—Albert A. Wiederhold.

Address—Julius H. Barnes.

Organ Recital.

Wednesday, Sept. 30, 10 a.m.

Subject of the Day—Readjusting Viewpoint and Methods to Changed Conditions.

Report—Committee on Revision of Constitution and By-laws—G. A. Richardson, Chicago, Ill.

Report—Committee on Nominations—F. R. Coates, New York, N. Y.

Election of Officers.

Claims Sessions

Tuesday, Sept. 29, 12:45 p.m.

Informal Luncheon—Ritz Carlton Hotel, followed immediately by opening session

Address of President.

Report of Executive Committee.

Report of Secretary-Treasurer.

Report—Committee on Nominations—Wallace Muir, Lexington, Ky.

Election of Officers.

Discussion—Should Association Act as Clearing House for Information Concerning Fake Claimants?

Round-table Discussion.

Wednesday, Sept. 30, 2:30 p.m.

Report—Committee on Uniform Negligence Law—J. S. Kubu, Cleveland, Ohio.

Report—Committee on Claims Association Work and Its Relation to the American and the T. & T. Associations—G. T. Hellnuth, Chicago, Ill.

Address.

Engineering Sessions

General Meeting of All Divisions,

Monday, Sept. 28, 2:30 p.m.

Report of Secretary-Treasurer.

Report of Executive Committee.

Address of President.

Report—Committee on Co-operation with U. S. Department of Commerce—E. P. Goucher, Washington, D. C.

"Trends," by F. R. Phillips, Pittsburgh, Pa.

Report—Committee on Heavy Electric Traktion—L. C. Winship, North Billerica, Mass.

"Diesel Engine for Bus Work," by Martin Schreiber, Newark, N. J.

ELECTRIC RAILWAY JOURNAL Maintenance Contest Award—Presentation by W. W. Wysor, Baltimore, Md.

Report—Committee on Welded Rail Joints—E. M. T. Ryder, New York, N. Y.

Report—Committee on Resolutions.

Report—Committee on Nominations—W. W. Wysor, Baltimore, Md.

Election of Officers.

Installation of Officers.

Presentation of Past-President's Badge.

"The Inter-relation of Claim and Legal Departments," by R. H. Nesbitt, Akron, Ohio.

Installation of Officers.

Presentation of Past-President's Badge.

POWER DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Power—Dwight L. Smith, Chicago, Ill.

Reports of Committees:

No. 1—Manual Review—J. Walter Allen.
No. 2—Mercury Power Rectifiers—H. W. Codding.

No. 3—Power Contracts—Ralph H. Rice.
No. 5—Catenary Specifications—John Leisenring.

No. 7—Trolley Construction Specifications—L. R. Wagner.

No. 8—Trolley Wire Reels—J. F. Neild.

No. 9—Trolley Bus Overhead Construction—A. J. Klatte.

General Discussion.

"Present Status of the Rectifier for Traction Service," by H. W. Codding, Newark, N. J.

"Trolley Bus Overhead Construction," by A. J. Klatte, Chicago, Ill.

The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

Reports of Committees:

No. 10—Lightning Protection—A. Schlesinger.

No. 12—Ferrous and Non-Ferrous Materials—H. F. Brown.

No. 13—Trolley Voltage Surveys—A. J. Klatte.

General Discussion.

Report of Committee:

No. 6—Trolley Wire Wear—H. S. Murphy.

"The Effects of Street-Railway Equipment and Service Characteristics on Energy Consumption," by T. F. Perkins and R. H. Sjoberg, Erie, Pa.

"Six Hundred-Volt Railway Substation Spacing," by E. A. Imhoff, Chicago, Ill.

PURCHASES AND STORES DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Purchases and Stores—C. A. Harris, Pittsburgh, Pa.

Reports of Committees:

No. 1—Manual Review—J. Fleming.

No. 2—Unit Piling and Standard Packages—A. E. Hatton.

No. 3—Stores Investment and Costs—W. S. Stackpole.

No. 4—Pricing Methods and Records—Harley Doncaster.

General Discussion.

"Standard Packaging," by A. E. Hatton, Pittsburgh, Pa.

Formal Discussion by Edwin W. Ely, Washington, D. C.

General Discussion.

The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

Reports of Committees:

No. 5—Standardization and Simplification of Stock—C. A. Harris.

No. 6—Material and Supplies Control—W. F. Maher.

No. 7—Bus Materials—W. S. Stackpole.

No. 8—Handling of Stationery—A. S. Duncan.

No. 9—Stores Material Handling Equipment—J. Y. Bayliss.

General Discussion.

"Handling Bus Materials from the Users' and the Vendors' Viewpoint," by W. E. Scott, Philadelphia, Pa.

General Discussion.

ROLLING STOCK DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Rolling Stock—Thomas H. Nicholl, Cleveland, Ohio.

"Brake Lining Development and Brake Tests," by F. C. Stanley, Bridgeport, Conn.

"Experience in Trolley Bus Operation," by W. C. Wheeler, Chicago, Ill.

The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

"Aluminum—Its Uses and Past Experience in Car Construction," by A. H. Woolen, New Kensington, Pa.

Reports of Committees:

No. 1—Manual Review—W. C. Bolt.

No. 2—Motor Coaches—P. V. C. See.

No. 3—Car Design—H. H. Adams.

No. 4—Lighting—R. W. Cost.

No. 5—Car Trucks—R. B. Smyth.

No. 6—Lubrication—J. H. Lucas.

No. 7—Trolley Buses—W. C. Wheeler.

No. 8—Air-Operated Car Equipment—A. D. McWhorter.

No. 9—Noise Reduction—H. S. Williams.

No. 10—Rheostatic Car Heating—A. W. Baumgartner.

No. 11—Current-Collecting Devices—Hugh Savage.

No. 12—Limits of Wear—Walter S. Adams.

General Discussion.

WAY AND STRUCTURES DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Ways and Structures—C. A. Smith, Atlanta, Ga.

Reports of Committees:

No. 1—Manual Review—W. R. Dunham, Jr.

No. 2—Special Trackwork—E. M. T. Ryder.

No. 3—Weed Elimination—J. I. Catherman.

No. 4—Wheel and Rail Contours—P. J. Mittens.

No. 5—Wood Preservation—C. A. Smith.

No. 6—Arc Welding—Chester F. Gallor.

No. 7—Alloy Steels for Special Track-work—P. A. Kerwin.

General Discussion.

Address.

The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

Reports of Committees:

No. 8—Pavement—Roy C. Cram.

No. 11—Track Construction—C. L. Hawkins.

No. 12—Rail Corrugation—H. S. Williams.

No. 14—Rails—C. A. Alden.

No. 15—Track Gauge—C. H. Clark.

No. 16—Foundations for Special Track-work—W. A. Underwood.

General Discussion.

Address.

Transportation and Traffic Sessions

Monday, Sept. 28, 2:30 p.m.

Address of President.

Report of Executive Committee.

Report of Secretary-Treasurer.

Report—Committee on Nominations—Samuel Riddle, Pelham Manor, N. Y.

Election of Officers.

Report—Committee on The Transportation Employee—Clinton D. Smith, Norristown, Pa.

Formal Discussion.

Report—Committee on The Passenger—W. B. Brady, Chicago, Ill.

Formal Discussion.

Tuesday, Sept. 29, 2:30 p.m.

Report—Committee on The Equipment—L. C. Datz, St. Louis, Mo.

Report—Committee on Operating Economics—Joe R. Ong, Cincinnati, Ohio.

Report—Committee on The Movement of the Vehicle—C. W. Wilson, Pittsburgh, Pa.

Formal Discussion.

Installation of Officers.

Presentation of Past-President's Badge.

Entertainment

Sunday, Sept. 27

9 a.m.-5 p.m.—Golf Tournament—Country Club of Atlantic City, Northfield, N. J.

9-11 a.m.—Hotel Musicales.

Concert programs in the main lounges of beach front hotels.

Monday, Sept. 28

AUDITORIUM BALLROOM, SECOND FLOOR

2:30-4 p.m.—Ladies' Informal Bridge.

4-6 p.m.—Tea and Dancing.

8:45-9 p.m.—Reception by President and Officers of the Association.

9 p.m.-1 a.m.—Informal Dance.

Tuesday, Sept. 29

3 p.m.—Ladies' Musicales, Song Recital by Albert A. Wiederhold, baritone; Edith M. Wiederhold, pianist and accompanist.

4:30-6 p.m.—Tea and Dancing.

8:30 p.m.—Advisory Council Session.

Informal Dancing.

Wednesday, Sept. 30

2:30 p.m.—Ladies' Pivot Bridge Tournament.

4:30-6 p.m.—Tea and Dancing.

9 p.m.-1 a.m.—Golden Birthday Party.

Informal Dancing.

Thursday, Oct. 1

2:30-4 p.m.—Ladies' Informal Bridge.

4-6 p.m.—Tea and Dancing.

9 p.m.-1 a.m.—Formal Dance.

NEWS of the Industry

Improvement Projects

Boston, Mass.—The State Department of Public Utilities has approved the plans of the Elevated for an addition to the present fare collection lobby and a shelter and waiting-room for bus passengers at the Everett Terminal.

Richmond, Va.—The new \$12,000 car and bus terminal of the Petersburg, Hopewell & City Point Railway, at Hopewell, Va., under construction for the past six months, was occupied on Aug. 24 for the first time. The old building is being torn down. The new building provides waiting rooms, restrooms for both white and colored persons, ticket offices and a modern lunch, soda fountain and cigar stand.

Brooklyn, N. Y.—Officials of the Board of Transportation have promised to investigate the possibilities of building new subway routes to the Bay Ridge and Dyker Heights sections.

St. Louis, Mo.—The contract for wrecking the ten-story building at Twelfth Boulevard and Washington Avenue to make way for the new \$1,500,000 passenger station and office building of the Illinois Terminal Railroad has been awarded to Merker & Company. The development will be in the charge of the Midwest Industrial Development Company, a subsidiary of the railroad. Plans for the building are in charge of architects Mauran, Russell & Crowell. The first unit, an eleven-story building with basement and sub-basement, will cost \$750,000. Ultimately the building will be twenty stories high.

Fare Changes

Gary, Ind.—More than 4,000 5-cent fares are being collected daily in the three short-haul fare zones on Gary Railways lines here. A 5-cent fare for a short haul was first tested on a twenty-block stretch on Broadway between Twentieth Avenue and the north Broadway loop at the steel mill gates. The rate was placed on trial for 30 days, beginning on June 1. The trial period was later extended. Two additional 5-cent zones were next established here for a 30-day trial period commencing on July 26.

Bus Operations

Spokane, Wash.—The departure of the four new 28-passenger buses bought by the Spokane United Railways from the Fageol Company in Oakland, Cal., was delayed at the factory, but the buses are expected to arrive here by Sept. 1. They are for the Cable Addition line.

(Late News Continued on Page 486)

An Operation, Not Nostrums, Seattle's Need

Plans to employ an expert to make a new survey of Seattle's Municipal Railway, at an estimated cost of \$50,000, received a serious set-back when Mayor Robert Harlin opposed the proposition. At the same time, F. J. McLaughlin, president of the Puget Sound Power & Light Company, issued a statement indicating that bondholders expect prompt action toward a solution of the system's difficulties, but will not insist on a survey. Mayor Harlin declared that the needs of the railway have been made known by previous surveys and experience in the operations of the system, and that what the system needs is expert management. He said:

We should hire the best man available, in whom all affected interests have confidence, and give him full power to run the system.

John A. Beeler, consulting engineer, who has been in Seattle for several weeks, offered to make a complete survey of the system under a plan by which the city and the power company, to whom the purchase price for the lines is still due, would divide the cost. A majority of the Council is believed to agree with the Mayor that the survey is not necessary. Mayor Harlin states that he will leave the public utilities department under the present assistant and acting superintendent, A. E. Pierce, pending settlement of plans for refinancing the railway.

President McLaughlin said:

As a citizen and taxpayer and as a creditor, we are, of course, vitally interested in the efficient operation of the railway. I have heard numerous criticisms as to service, and suggestions for improvement.

The Business Outlook

PRECEDENT of 1921 favors the hopeful prospects that the endurance dance of this unduly prolonged depression ought by all odds to end this month, if ever. In the summer of 1921 stocks and trade sloshes along in uncertain stagnation, as they have this time, till September. The recent improvement in textiles and other consumer industries is strikingly similar to that in 1921. Still, the third week of August gives no sign of expected seasonal improvement, and scepticism about its prospective strength increases. Late building figures alone lend a little fitful light to the encircling gloom growing out of the steadily weakening bond market. The European scene continues a succession of crises met by emergency measures which only stave off the inevitable large-scale international action on fundamental issues of which there is still no sign.

—*The Business Week.*

I have consistently maintained that the matter of providing efficient transportation service rests with the city, not with the Puget Sound Power & Light Company, but that, in our position as a citizen and as creditor, we wanted to help in solving present difficulties. Any plan that makes the operation more efficient is certainly welcome.

The railway system, as it is now operated, is not able to pay its obligations. When an individual gets real sick it is considered desirable to call in a good doctor.

I have not and will not make any request that the Council have a survey made. Should they decide to do so I do not propose to make any recommendation as to who shall be employed or what the nature of the survey shall be.

I do believe, that in the best interest of all concerned, a constructive program looking to a solution of the transportation difficulties should be initiated promptly.

Calumet Sale Approval Sought

Approval of the sale of the physical properties and permits of Calumet Railways, Inc., Shore Line Motor Coach Company and Mid-West Motor Coach Company to the Chicago & Calumet District Transit Company, Inc., is asked in a petition filed with the Public Service Commission of Indiana.

The Chicago & Calumet District Transit Company, Inc., was organized by Walter J. Cummings, Chicago, who recently contracted to purchase the railway system in Hammond, East Chicago and Whiting and the motor coaches which operate in the same general territory.

A second petition has been filed in which the commission is asked, in event it approves the sale, to rescind its order for abandonment of operation of the railway. This order, directed to Calumet Railways, Inc., originally authorized abandonment of service on July 1, but when negotiations for sale of the system were begun, it was amended so that operation might be continued beyond July 1. If the Chicago & Calumet District Transit Company is authorized to purchase the transportation properties, it plans to continue to operate them.

For the present, operation of the railway system and the routes of the two motor coach companies will continue under the present management.

Marylanders to Meet at Braddock Heights

The mid-year meeting of the Maryland Utilities Association will be held on Sept. 11, 1931, at the Vindobona Hotel, Braddock Heights, Md. Beginning at 10 o'clock, there will be meetings of the electric, gas and transportation groups at which many pertinent problems will be discussed. The afternoon will be devoted to sports and recreation, with ample provision made for entertainment. There will be golf, bowling, swimming, sightseeing trips and bridge. In the evening delegates will dine and dance.

The Vindobona is located 6 miles from Frederick on a narrow ridge overlooking two valleys with mountains in the distance. Copies of the program and full information about the meeting are expected to be ready about Sept. 1.

Bus Operations

(Continued from Page 485)

Albany, N. Y. — The Public Service Commission has just authorized the receivers of the Capitol District Transportation Company, Inc., in conformity with an order of the United States District Court, to issue receiver's certificates amounting to \$153,720 for the purchase of thirteen buses and two snow plows.

Providence, R. I. — A petition seeking authority to substitute service by bus for the Branch Avenue trolley line has been filed by the United Electric Railways with the Public Utilities Commission. The company would operate from 30 to 36 buses over the route, and asks permission to carry standing passengers to the extent of 50 per cent of the rated seating capacity of the buses.

Wabash, Ind. — Local street cars were supplanted by bus service on Sunday, Aug. 30. Service is furnished by the Indiana Service Corporation with three new six-cylinder Fargo coaches, each seating 21 passengers. The buses operate over the same routes as the former street cars. Fares have been increased from 5 cents to 10 cents cash, or four tickets for 25 cents. The buses are operated for seventeen hours daily on headways varying from 20 to 40 minutes.

Pittsburgh, Pa. — Thirty-eight operators of the Pittsburgh Motor Coach Company did not have an accident of any kind during the three months of April, May and June. A total of 349,050 miles was driven by these men.

Brooklyn, N. Y. — A temporary injunction has been granted by Supreme Court Justice Dodd barring operation of two lines by the Kings Coach Company, an unfranchised concern which has been operating a line in the Gerritsen Beach section and another from Flatbush Avenue to the Rockaway ferry. Recently the Midtown Transit Company, another independent operator with lines in the Sheepshead Bay district, was restrained by a similar injunction. The only pending litigation against the Brooklyn Bus Corporation, railway subsidiary, is the suit brought by Paul Blanshard of the City Affairs body.

Greensboro, N. C. — The City Manager announced, following a conference with K. K. Garrett, general manager of the North Carolina Public Service Company, that plans were being worked out for the substitution of buses for street cars on the Asheboro run.

Syracuse, N. Y. — Stockholders of the Syracuse Northern Railroad have confirmed the action of the directors in deciding to substitute buses for trolleys on its route between Syracuse and South Bay, N. Y.

Belleville, Ill. — Officials of the East St. Louis & Suburban Railway have declined to extend motorbus service a distance of seven blocks on North Church Street. They say the probable traffic on North Church Street would not justify a twenty-minute schedule and that a 30-minute headway would prove unsatisfactory.

Baltimore, Md. — The United Railways & Electric Company on Aug. 25 placed in service ten of its new buses, the first of an order for 50 of similar type soon to be delivered. The first group replaces vehicles now in service on the Mount Royal Avenue route. Each vehicle seats 33 passengers, and is equipped for front entrance and exit.

St. Louis, Mo. — The Public Service Commission will conduct a public hearing on Sept. 9 on the application of Rapid Transit, Inc., to operate buses on Federal Highway No. 40 between Wellston and St. Charles. This application has a direct bearing on the St. Louis Public Service Company's plea to abandon service on the western 7 miles of its St. Charles rail line, now being operated at a loss.

Service Changes

St. Louis, Mo. — The St. Louis Public Service Company plans to install one-man cars on its Compton division. During the morning and evening rush hours, service will be increased 20 per cent, and the total miles operated during the day will be increased 15 per cent. Cars will be operated every two minutes during rush hours in the morning and every 2½ minutes in the evening rush period. Cars equipped with the latest safety devices and similar to those now in use on the Tower Grove line will be installed on the Compton division.

Los Angeles, Cal. — The Pacific Electric Railway has applied to the Railroad Commission for authority to discontinue local auto stage service in North Hollywood, and has applied for a certificate of public convenience and necessity to operate auto stage service between North Hollywood and Hollywood, and between intermediate points in Los Angeles.

Harrisburg, Pa. — Permission to operate one-man trolley cars between Greensburg and Irwin has been asked in an application filed with the Public Service Commission by the West Penn Railways.

Vancouver, B. C. — The special committee of the City Council dealing with British Columbia Electric Railway affairs is to consider the advisability of asking the company to provide a belt line, embracing eight city blocks, as an alternative to the city terminus of the Oak Street car line.

Camden, N. J. — Plans for the operation of a high-speed rail line over the Delaware River Bridge were advanced another step when the Transportation Committee was empowered on Aug. 21 by the Delaware River Joint Commission to negotiate with the Philadelphia Rapid Transit Company and others. The commission authorized a bond issue, not to exceed \$44,000,000, to repay New Jersey, Pennsylvania and Philadelphia for their interest in the bridge, and to finance construction of the high-speed line.

Indianapolis, Ind. — Public hearing on the amended petition of the Indiana Railroad for abandonment of a portion of its interurban line between Indianapolis and Richmond has been post-

poned by the Public Service Commission until Sept. 17. Action to abandon the entire 68-mile line between Indianapolis and Richmond was begun last spring by Elmer W. Stout, receiver for the former Terre Haute, Indianapolis & Eastern Traction Company. Before a ruling was handed down, however, the company asked that only that part between Indianapolis and Dunreith be abandoned. Under this plan, service would be continued to Richmond indirectly.

Pattonville, Mo. — Counsel for residents here has protested to the Public Service Commission against the application of the St. Louis Public Service Company for permission to abandon service on its St. Charles line, between Pattonville and St. Charles. The company contends it has been operating the line at a loss.

Spokane, Wash. — Because of the conflict among property owners and residents of Browne's addition for and against proposed street car line changes in that district, the City Council has placed on file the franchise for a proposed new line of the Spokane United Railways running east from Fourth and Spruce on Fourth to Hemlock and south on Hemlock to Sixth. The alternative proposal of the company was to run south from Fourth on Chestnut to Sixth for a connection between the West Pacific and Fort Wright lines.

Marion, Ind. — The Northern Indiana Power Company's interurban freight station on Adams Street has been consolidated with that of the Indiana Railroad at 1219 South McClure Street, following the abandonment on Aug. 15 of the Marion-Bluffton division of the Indiana Service Corporation, which formerly maintained joint freight terminal facilities with the Northern Indiana Power Company. The power company's passenger station will remain at the present Adams Street location. Both lines are operated by a co-ordinated management as units of the Indiana Railroad System.

Spokane, Wash. — Fare boxes and metal tokens will soon displace tickets on the Manito-buses and Hillyard and Broadway-Lidgerwood cars of the Spokane United Railways. The Johnson Fare Box Company of Chicago is supplying the fare boxes and metal tokens. The fare box and token will be used later on the Cable addition buses.

Financial News

Boston, Mass. — Trustees of the Boston Elevated Railway on Aug. 26 declared a quarterly dividend rental of \$1.25 on the common stock of the company, thereby reducing the dividend rate to a \$5 annual basis, compared with the \$6 basis formerly in effect. The reduction constitutes the initial declaration at the new rate under the public control bill, which provides for retirement of preferred stocks by sale of 6 per cent bonds to the Metropolitan Transit District. The \$5 dividend, which is payable on Oct. 1 to stock of record Sept. 10, is guaranteed at least for the next 28 years.

(Late News Continued on Page 488)

Substantial Business Built in Handling Road Materials

Five years ago—nothing.

Estimated for 1931—460,000 tons, with a total of 270,000 already delivered.

That, in a nutshell, is the story so far of the development, from scratch, of a substantial business in the hauling of road building and maintenance materials by the Indiana Railroad System.

The story began on the organization of the Indiana Service Corporation at Fort Wayne, but subsequent chapters have been written at various points on the system, of which the Indiana Service is a part. And the end is not yet.

Five years ago the idea that electric railways could be of service in handling the immense tonnage of road building and maintenance material used in Indiana was a new one to contractors and State and county officials. The first traffic represen-

down or eliminated, and there is no delay or waiting for switch engines or motors to facilitate unloading.

So successful has this service been that Ben Petty, assistant professor of highway engineering at Purdue University, investigated the plan and has since given it further study and attention. In fact, W. L. Snodgrass, general superintendent of traffic of the Indiana Railroad System, was invited by Professor Petty to describe the service before the annual meeting of the Road School at Purdue.

Expansion of this service is being planned and vigorously promoted by the Indiana Railroad System's traffic department.

If This Be Intimidation

Police of East St. Louis, Ill., are seeking to determine whether a shot fired through the motorman's vestibule of a street car on the Broadway division of the East St. Louis Railway resulted from the company's quarrel with jitney drivers.



Indiana's roads profitable pay load

tatives who called on these men were received without enthusiasm.

The electric railway men retired, but only in search of ammunition for a heavier bombardment of the sacred heights of habit and established custom. Renewing the attack, the electric men fought a long and determined battle. With the years has come an impressive, although far from complete, victory for the attacking forces.

It was in 1928 that the plan first recorded success. The initial jobs were handled with a dozen cars borrowed from the maintenance department of the Indiana Service Corporation. It wasn't long before the company was justified in buying ten new steel differential, side-dump cars, electrically controlled.

It was at this point that the outstanding advantages of moving road materials by electric railway became apparent. Contractors and public officials were quick to learn and appreciate the advantages of this type of service. First and foremost is a saving of from 10 to 20 cents a ton in the cost of handling. The cost for the contractor of unloading the car is eliminated entirely by the electrically operated dumping equipment. A six-car train can be completely unloaded in slightly more than two minutes, with the labor of one man the only cost involved.

Second, this system of delivery eliminates demurrage charges. Its flexibility and its speed prevent delays at the scene of construction activity and keep an even flow of trucks running to the concrete batcher.

The setup of trackage and storage for cement is eliminated, and truck hauling distance is substantially cut through the slight cost of establishing new unloading points. Storage warehouse space is cut

Acting on a petition filed by the Illinois Commerce Commission, Circuit Judge Miller at Belleville has enjoined 202 jitney operators from competing with the street cars of the East St. Louis Railway and the East St. Louis & Suburban and the buses of the Blue Goose Motor Coach Company. The State commission charged the service men with defying State laws. In order to avoid the terms of the injunction some of the jitney men are carrying passengers under a voluntary contribution plan while others have organized "clubs," for which they act as the hired chauffeur. Other cars have extended their operations to St. Louis, under the theory that interstate operation places them beyond the jurisdiction of the Illinois Commerce Commission.

Coming Meetings

Sept. 9-10—Central Electric Railway Master Mechanics' Association, Cincinnati, Ohio.

Sept. 11—Maryland Utilities Association, Braddock Heights, Md.

Sept. 26-Oct. 2—Annual Convention, American Electric Railway Association, Atlantic City, N. J.

Sept. 28-29—Annual Convention, National Association of Motor Bus Operators, Atlantic City, N. J.

Oct. 12-19—Annual Safety Congress Including Special Electric Railway Section, Chicago, Ill.

Oct. 29-30—Annual Transportation Meeting of Society of Automotive Engineers, Washington, D. C.

Jan. 27-29, 1932—Electric Railway Association of Equipment Men, Southern Properties, Richmond, Va.

Muncie to Pay the Penalty of Competition

Abandonment of the local railway system in Muncie, Ind., was proposed by the Indiana Railroad in a petition filed on Aug. 18 with the Public Service Commission. Until last year the local service was operated by the former Union Traction Company. It has been unprofitable since 1926. The petition stated that "no change can be made in the operations that will increase revenues or reduce expenses so that the deficit can be eliminated or substantially reduced." The company concluded in its petition that there is no public necessity for local service in Muncie or other cities in the State under 75,000 population. Ten single-truck one-man cars are being operated on the Muncie city lines, paralleled by independent bus lines in almost all parts of the city. Outsiders have advocated protecting the rail lines from the inroads of bus competition by giving the railway exclusive passenger carrying privileges in the sections of the city which they serve.

BOOK REVIEW

A Scholarly Presentation

"Onward Industry!—The Principles of Organization and Their Significance to Modern Industry," by James D. Mooney and Alan C. Reiley. Harper & Brothers, New York. 564 pages. \$6.

When fears first gripped our primitive ancestors they banded together for a common purpose — protection. From this, organization has expanded and become more complicated, but the underlying principle of a common objective of organization remains the same. As the authors put it, organization is "the form of every human association for the attainment of a common purpose."

With the state, church and army as examples of successful organization, Messrs. Mooney and Reiley attempt to discover if the theory and history of organization can be applied for similar objectives in industry. No fault can be found with their exposition of the subject as applied for generations in the state, church and army, and the authors seek to answer the question which they pose, whether the history and theory of organization throw any light on sound organization methods for industry. Especially interesting in the light of recent events is the discussion of the subjects "The Moral Problem of Modern Industry" and "The Economic Problem of Modern Industry." The final chapter is particularly provocative in its discussion of the present challenge to American business leadership.

Mr. Mooney is vice-president of the General Motors Corporation, and Mr. Reiley was connected with the Remington Typewriter Company for many years as an executive and has been a profound student of history and philosophy. Their knowledge enables the authors to handle the subject well historically. Certainly the book is informative. As Messrs. Mooney and Reiley see it, the application of principles of organization "requires but the technique of the organizer, plus the qualities of true and enlightened leadership, to apply them in the more efficient pursuits of all worthy objectives."

G. A. Richardson Recommended for A.E.R.A. Presidency

The Committee on Nominations of the American Electric Railway Association unanimously recommends the following to be placed in nomination for election as officers and members-at-large of the Executive Committee for the year 1931-32:

For president, G. A. Richardson, vice-president and general manager Chicago Surface Lines.

For first vice-president, J. H. Alexander, president Cleveland Railway.

For second vice-president, Walter A. Draper, president Cincinnati Street Railway.

For third vice-president, W. E. Wood, vice-president Engineers Public Service Company.

For treasurer, Barron Collier, president Barron G. Collier, Inc.

For operating members-at-large of the Executive Committee for the three-year term expiring 1934:

A. B. Paterson, president New Orleans Public Service, Inc.

Robert M. Feustel, president Indiana Service Corporation.

For manufacturer members-at-large of the Executive Committee for the three-year term expiring 1934:

M. B. Lambert, assistant to vice-president Westinghouse Electric & Manufacturing Company.

H. E. Listman, vice-president General Motors Truck Company.

John B. Tinnon, sales manager Metal & Thermit Corporation.

The committee has not placed in nomination any one for the office of fourth vice-president, although it has agreed upon a nominee which it will be prepared to submit from the convention floor, if the proposed change in the constitution eliminating this office, is not adopted.

The committee, also having been informed of the recommendation of the Committee on Revision of the Constitution and By-Laws proposing the addition of an operating member-at-large of the Executive Committee to serve for a one-year term, has unanimously agreed upon a nominee for this office and is prepared to submit his name from the convention floor if that recommendation of the Committee on Revision of the Constitution and By-Laws is approved.

The Committee on Nominations includes: H. C. Abell, Stanley Clarke, Safford K. Colby, George Frev, Willits H. Sawyer, L. F. Stoll, and F. R. Coates, chairman.

Texas Interurban Under Option

An option good for 60 days has been secured by R. C. Duff, Houston, for the purchase of the interurban electric railway of the Eastern Texas Electric Company, between Port Arthur and Beaumont, 25 miles. If the transaction is consummated, it is understood the line will be made a part of the electric railway projected by H. K. Johnson, with whom Mr. Duff is associated. This line is to run between Houston and Port Arthur via Goose Creek, approximately 85 miles. Mr. Duff is president of the Waco, Beaumont, Trinity & Sabine Railroad with lines between Weldon and Livingston, 48 miles, and Trinity and Colmesneil, 67 miles. Some time ago the Interstate Commission approved the construction of extensions from Weldon to

Waco and from Livingston to Beaumont, but denied that part of the application providing for a line from Beaumont to Port Arthur. By acquiring the interurban line, the Waco, Beaumont, Trinity & Sabine would secure an entrance to Port Arthur.

Financial News

(Continued from Page 486)

Bucyrus, Ohio.—The City Council has declined to adopt a resolution granting permission to C. G. Mayers, Cleveland, receiver for the Cleveland-Southwestern Railway & Light Company to dismantle the company's interurban line in Bucyrus. The action was taken after Council urged that the city unite with other cities to have other interests take over the interurban line and operate it again. On the other hand, the Galion City Council has voted to permit the system there to be dismantled.

New York, N. Y.—The Third Avenue Railway has declared a semi-annual interest payment of 1½ per cent on the 5 per cent income bonds, payable Oct. 1. The bonds have been on a 2½ per cent annual basis since 1925.

Mystic, Conn.—The Groton & Stonington Traction Company, at a meeting of directors on Aug. 20, voted to pay interest due on July 1, 1931. The payment was anticipated in a vote on June 8, but it was necessary to assure earnings were sufficient. It has now been determined that earnings after interest for six months were at the rate of \$1 a share. Net for the six months was \$12,584. Bond interest lowers the net to \$5,060.

Indianapolis, Ind.—Suit to foreclose a \$4,000,000 mortgage on the property of the Indianapolis Street Railway has been filed in Circuit Court here by the Central Hanover Bank & Trust Company, New York City, trustee for the Citizens Street Railroad 44-year 5 per cent bonds, totaling this amount. The suit paves the way to remove the company from receivership and for its reorganization. Under the reorganization plan \$5,000,000 would be spent for new equipment and to rejuvenate the system.

Regulation and Legal

Minneapolis, Minn.—The City Council has engaged W. C. Fankhauser, specialist in securities for the California Railroad Commission, to assist in its fight before the Minnesota Tax Commission against a proposed reduction in the property valuation of the Minneapolis Street Railway. The Council had previously retained Walter W. Cooper, valuation expert with the California Commission, for similar services. The hearing is early in September.

Columbia, S. C.—Recommendation has been made that the Broad River Power Company pay a \$125,000 fee to attorneys who conducted the litigation to force it to operate cars here. This finding is contained in a report to the South Carolina Supreme Court by Special Referee Perrin of Spartanburg. The attorneys had asked \$250,000. The company also would pay certain lesser

costs in the case, under the referee's recommendations. The referee points out that the case is "one of the most novel and interesting heard or tried in this State for many years."

Highwood, Ill.—Hearings in the Interstate Commerce Commission's investigation of the ferry-truck service facilities operated by the Chicago, North Shore & Milwaukee Railroad, have been assigned to be heard at Chicago on Nov. 3. The facility embraces the loading of detachable truck bodies on railroad flat cars.

Chattanooga, Tenn.—The Tennessee Electric Power Company has filed a bill in Chancery Court against T. E. Boyd, operator of a jitney line from the city to the suburbs, to enjoin him from operating his jitneys in competition with the plaintiff's street cars. Restraint is sought on the grounds that the jitneys failed to comply with the law by securing a certificate from the Public Utilities Commission.

General

Hartford, Conn.—Tests made by the State Motor Vehicle Department of erstwhile motormen who would become bus operators because of the substitution of buses for trolleys have disclosed that many of these men when given tests are unable to secure a certificate which would permit them to operate a public service motor vehicle.

Philadelphia, Pa.—President Judge Harry S. McDevitt, of Common Pleas Court No. 1 has warned Philadelphia Rapid Transit Company men against the union now seeking to organize the Philadelphia transit workers. He told the employees to "beware of wolves in sheep's clothing" and urged them to place their faith in the heads of the company.

Detroit, Mich.—A delegation of shop employees of the Detroit Municipal Railway, headed by Neil McClellan, business agent for the Amalgamated Association, has protested to Mayor Murphy against the working hours allotted to them. The men now are employed six hours a day, five days a week. They receive an average wage of 80 cents an hour. The delegation requested that the working day be increased.

Springfield, Ohio—A reduction of 10 per cent in the salaries or wages of all employees was announced on Aug. 13 by the Springfield Railway. The reduction is effective immediately. W. H. Sawyer, receiver, declared that the gross income of the company during the past six months was less than the expenses and that the step was necessary to continue operation. The company operates the co-ordinated railway and bus service here.

Philadelphia, Pa.—A new deal between the city and Philadelphia Rapid Transit Company, covering operation of rapid transit lines, is necessary, John A. McCarthy, Finance Committee chairman of the reorganized board of directors of the company, declares. The new agreement, he said, "must be free from prejudice, politics and quackery" in order to preserve P.R.T. and solve the city's subway problem.

London Transport Bill

Approved by Committee

After hearings of evidence and arguments extending at intervals over a period of many weeks, the joint committee of the House of Lords and the House of Commons on the London Passenger Transport Bill decided on July 20 to allow the bill to proceed, subject to certain alterations. It may be recalled that the main object of the bill is to transfer to an especially nominated transport board all the passenger transport undertakings in the London traffic area, that board to run them as one consolidated, co-ordinated undertaking.

THE L.C.C. POLICY

At a sitting of the joint committee on July 7, counsel for the London County Council stated that a meeting of the Parliamentary Committee of the County Council was held shortly after Sir Oscar Warburg had given his evidence, and resolution was passed confirming the policy as to the need for a larger body to supervise the work of the transport board proposed by the bill. That resolution declared that the proposed transport board should be responsible to a larger body; that the larger body should be composed of members specially selected and equipped as regards financial, labor, and other consolidations; and that one-third of them should be appointed by local authorities. A subsequent meeting of the County Council confirmed the resolution.

Sir William McLintock, who prepared the financial details embodied in the bill, was questioned by Bruce Thomas, K.C., on behalf of the Society of Motor Manufacturers and Traders. With regard to a proposed contract between the Associated Equipment Company (associated with the London General Omnibus Company) and the proposed transport board, he said that it was intended that the board should be obliged to purchase for the first ten years 90 per cent of the chassis of its standard fleet of buses from the Associated Equipment Company. Mr. Thomas pointed out that those whom he represented would be excluded from the market to that extent. The witness, resuming, said that from 1921 to 1930 the total purchase by the London General Omnibus Company from the Associated Equipment Company amounted on the average to £870,000 a year, and he estimated that it would be £750,000 a year under the new board. Mr. Thomas then urged that the board should be left free to make whatever contracts it thought fit.

TERMS FOR INDEPENDENT BUSES

In speaking on July 8 for the Association of London Omnibus Proprietors, Mr. Montgomery, K.C., submitted that the proposal to pay these independent proprietors in cash or stock as the arbitration tribunal might determine was unfair. He asked that the bill provide that his clients should be paid in cash. It was also announced that a settlement had been reached between the promoters and the Westminster Coaching Services and the Westminster Omnibus Company.

On July 14 determined opposition was made to the proposal that the transport board should be empowered to manufacture motor vehicles and spare parts and to carry on business as garage proprietors. Bruce Thomas, K.C., argued that, if the bill was passed in its present form, grave injustice

would be inflicted on manufacturers. It was contended that the transport board should be prohibited from manufacturing motor vehicles or spare parts and that the board should be left free to buy from manufacturers. Walter Bonablock, a past president of the Institute of British Carriage Builders and Automobile Manufacturers, stated on July 16 that about £1,500,000 capital was involved in the industry which he represented and that not a single firm in the industry was working to capacity. The sole concern of his association was to try to preserve to the industry the business which it had been getting in the past. This closed the case for the opposition.

Lord Lytton, the chairman of the joint committee, in announcing on July 20 that the bill should be allowed to proceed to its remaining stages, said that the first alteration which the committee wished to make as a condition was that the minimum period of office of a member of the transport board should be three years. He went on to say that the committee had decided that the transport board should not have power to manufacture, but this would not limit its right to repair. The committee wishes the board to be perfectly free either to accept the new contract by agreement with the Associated Equipment Company, or to place its orders elsewhere, but the Associated Equipment Company should have the right to compensation for the loss of the new contract.

ADJUSTMENTS

For several days after this, the joint committee heard points of detail to give effect to the main decision. The committee also considered a question arising out of the decision refusing the transport board power to manufacture. The committee had indicated that it would be prepared to consider allowing the board to continue to manufacture the bodies of buses at the Chiswick works of the London General Omnibus Company, which are to be transferred to the board. The London General Omnibus Company has manufactured bus bodies for its own use for the last 70 years, and until the last few years manufactured to meet the whole of its requirements. When rapid changes in construction created recently a large temporary demand for new omnibus bodies, some of the work was placed outside, but there has been no steady placing of orders outside. If the board were denied power to continue the work at Chiswick, 500 men would lose their employment, the board would be prevented from using a valuable plant, and the outside manufacturers would benefit by trade which they did not have at present and which they never had. He asked the committee to give the board power to continue to manufacture bodies.

On July 30 the joint committee ended its prolonged labors on the bill. The chairman (Lord Lytton) stated that the committee had drafted a clause, to be inserted in the bill, which would give the fullest possible discretion to the arbitration tribunal regarding the principles on which compensation is to be awarded to those undertakings which are to be transferred and which have not made agreements with the promoters. The clause directed the arbitration tribunal to secure that the standard of the consideration payable should be fair and equitable.

Clauses for insertion in the bill were then submitted by the promoters for the purpose of setting up conciliation machinery of the same character as that established by the Railways Act, 1921. After hearing objections from non-trade unionist interests, the committee approved the clause.

PROSPECTS

On July 31, the day after the joint committee had finished its work on the bill, Parliament adjourned till Oct. 20. Nothing further can accordingly be done on the bill till after that date.

More Street Railway Lines for Russia

Among the tremendous tasks confronting the Soviet Union is that of raising the standard of housing and sanitation in the U.S.S.R. to the accepted level in the advanced industrial countries. The inheritance from pre-war Russia in this respect was an exceedingly poor one. For instance, in pre-war Russia only nineteen cities out of 1,063 in the Russian Empire had sewage systems, about 200 had central waterworks, 34 cities had street car lines and 32 possessed municipal gas works. Not only was the country backward in modern sanitary installations and municipal services, but what facilities did exist deteriorated during the years of the world and civil wars.

At present new street car lines are being built in such new industrial centers as Cheliabinsk in the Urals, Grozny in the North Caucasus, Schakhty in the Donetz Basin, Zaporozhye in the Ukraine, and Erivan in Armenia. The extent of the street car system in the Soviet Union in 1926-27 totaled only 2,044 km. (1,275 miles), and this was extended to 2,437 km. by 1929-30. During the same period rolling stock increased from 4,497 cars to 5,615: the number of cars in daily use grew from 3,120 to 4,564 and the passengers carried from 1,490,000,000 to 2,750,000,000 in number.

In Moscow the greatest achievements have been made. In 1928 each street car carried an average of 491,000 passengers: in 1930 the number rose to 637,000, and it is anticipated that this year the number will increase to 757,000. Between 1913 and 1930 the passenger traffic increased four-fold, the length of street car lines 145 per cent, and the average number of cars in use daily 167 per cent. The network of tracks on the outskirts of the city will be considerably extended and the Moscow City Railroad plans the construction of 43 km. (27 miles) of new street car lines. Plans for building a subway are being discussed.

"Expresscalator" in London Subway

The fastest escalator in the United Kingdom has just been installed at the Highgate Station of the London Underground Railways, where it carries passengers to and from the subway at a speed of 125 ft. per minute. The new escalators can reach a speed of 180 ft. per minute. It is intended to increase the speed gradually and study how passengers adapt themselves to the change. Highgate Station has a rubber floor. It is also equipped with a set of automatic machines which juggle with money like robot bank cashiers, making it unnecessary to place coins in the slots one at a time. A handful of half-pennies is swallowed at one gulp by them and the correct ticket issued with never a mistake.

PERSONAL MENTION

E. K. Eastham Directs St. Louis Personnel Plan

A newly established personnel department, with E. K. Eastham as director of personnel, will be directly responsible for all activities of the St. Louis Public Service Company, St. Louis, Mo., which are strictly of a personnel nature. The department will act in a supervisory capacity with regard to activities in other departments which directly affect personnel or industrial relations. It will act in a consultant capacity to other departments on matters indirectly affecting personnel or industrial relations.

Establishment of the new department marks a recognition of the need for concentrating responsibility for personnel activities. The personnel department will work toward the end of furthering sound industrial relations and will co-operate with all other departments in helping to meet their personnel needs and problems.

Mr. Eastham, director of personnel, will be responsible to the president and will report through E. F. Thayer, assistant to the president. The activities for which the personnel department will be directly responsible are as follows:

Accident Prevention—Mr. Eastham has been responsible for accident prevention work for a number of years, as safety director. He will continue to be responsible for it, but a new safety director will be appointed as soon as it is feasible, to report to Mr. Eastham.

Employment and Placement—The preliminary interviewing of all prospective employees will hereafter be handled by the personnel department. This includes office workers as well as trainmen, mechanical department employees, etc. Requisitions for regular or temporary employees, after having been approved by the president or vice-president and general manager, will be forwarded to the personnel department. Individuals who have been interviewed and approved by the personnel department will be sent to the requisitioning department head for approval.

A job analysis survey will be undertaken by the personnel department to determine what jobs and pay brackets are now in existence. Ultimately, the department will be in a position to assist in effecting job placements as between various departments.

Education and Training—The present policy of training conferences and classes will be continued and amplified under the jurisdiction of the personnel department. A supervisor of education will be appointed to be responsible for this work. Close liaison will be maintained with the transportation department, through the superintendent of instruction.

Employee Magazine—The editor of the *Public Servicer* is transferred from the advertising department to the personnel department. Mr. Allen, advertising manager, will continue to maintain a supervisory direction over the craftsmanship and technical production of the *Public Servicer*, and will advise also on articles bearing on company or management policy which may be inserted in the magazine from time to time.

Mr. Bolling, editor of the *Public Servicer*, in addition to his editorial duties, will as-

sist with such other personnel work as may be assigned to him.

Mr. Eastham has for many years been the safety director of the company, a position in which he was constantly brought in contact with the entire operating force, and one which the management believed eminently fitted him for the new position of director of personnel. Under Mr. Eastham's direction, the conference training plan for employees has achieved notable results during the past year and one half.

Messrs. Coffy and Van Sickel Advanced

Robert C. Coffy has been made manager of the Eastern division of the Oklahoma Gas & Electric Company with headquarters in Muskogee, and W. S. Van Sickel has been named to succeed Mr. Coffy as vice-president and general manager of the Mississippi Valley Power Company and president of the Fort Smith Traction Company, Fort Smith, Ark.

Mr. Coffy succeeds W. H. Crutcher, who died recently. Mr. Coffy has been associated with the Bylesby organization since 1908, when he joined the Oklahoma Gas & Electric Company. Mr. Van Sickel has been associated with the Bylesby organization since 1907, and until recently served as assistant general manager in charge of operation of the Fort Smith Traction Company and the Mississippi Valley Power Company.

E. T. Fitzgerald on Michigan Commission

The personnel of the Michigan Public Utilities Commission was completed by Governor Wilbur M. Brucker on July 22, with the appointment of Edward T. Fitzgerald as the fifth member. Mr. Fitzgerald, whose home is in Detroit, formerly served as secretary to Mayor Marx there, the only public office he has heretofore held. Born in St. Paul, Minn., he is 42 years old. Moving to Detroit in 1908, he joined the staff of the *Detroit News*, and served as reporter for more than five years.

J. A. Kiggen, Jr., Heads White Motor Coach Division

Formation of a motor coach division, a new sales department, is announced by George F. Russell, vice-president and sales manager of the White Company. To this post the company has advanced J. A. Kiggen, Jr., for the past two years New York State manager for the company. He will have headquarters in Cleveland. Mr. Russell said that the rapid advance of motor coach transportation makes it necessary for the White Company to afford to this field an organization of trained personnel which can devote its entire time to meeting and solving coach problems.

Mr. Kiggen has been with the White organization since July 18, 1921, when he enrolled in the technical apprentice course. After he was graduated from this course he entered the repair department in Cleveland, serving successively as foreman and general foreman. He

later joined the export department and became service manager, subsequently becoming assistant to the vice-president of the Eastern region and then being promoted to manager of the New York State district.

George M. Wilkins, formerly branch manager at Albany, succeeds Mr. Kiggen as manager of New York State district. Mr. Wilkins has been with the White Company since 1924, serving as a salesman at Syracuse and Utica, later being manager at Utica.

Succeeding Mr. Wilkins as branch manager at Albany is W. G. Winslow, who has been manager at Utica. Mr. Winslow joined the White Company in January, 1925, as a retail salesman at Boston. He was made manager at Utica in 1930.

Marmont Edson, branch manager at Syracuse, will also manage the Utica branch.

J. S. Bleecker With Lukens Steel

John S. Bleecker has been appointed manager of sales of Lukenweld, Inc., (division of Lukens Steel Company), Coatesville, Pa. Mr. Bleecker was graduated from the Massachusetts Institute of Technology in 1898 where he specialized in both mechanical and electrical engineering. He began his career with the American Bell Telephone Company. Most of his activities from 1901 to 1928 were confined to executive management of many enterprises for Stone & Webster, Day & Zimmermann, and Bates, Inc. From 1928 and until his association with Lukenweld, Inc., in 1931, he was a registered professional engineer engaged in industrial and public utility work, specializing particularly in transportation and merchandising.

Commission Appoints Motor Transport Inspectors

Milton R. Stahl, chairman of the Missouri Public Service Commission, has appointed two inspectors for the bus division of the commission. They will assume their duties on Sept. 15. They are Coin Combs, Springfield, and O. J. Beuschert, Columbia. The appointment of the inspectors was authorized in the bus and truck regulatory law passed by the recent Missouri General Assembly. A conference of bus and truck operators with members of the Missouri Public Service Commission was held in Jefferson City on Aug. 21 to discuss the new regulations for buses and trucks.

Charles E. Sperrow has resigned as vice-president, general manager and director of the Stark Electric Railway, Alliance, Ohio. Mr. Sperrow will continue his association with the Suburban Power Company, but plans to leave Alliance soon for a visit in California. After serving eleven years with the Westinghouse Electric & Manufacturing Company, Mr. Sperrow joined the Suburban Power Company in May, 1927. He was transferred to Alliance from Cleveland in March, 1928. A short time later he was named assistant general manager of the Stark Electric Railroad, being promoted to the office of vice-president and general manager one year later.

Westinghouse Promotes Messrs. James, Davis, and Loomis

William F. James, formerly Middle Atlantic district manager of the Westinghouse Electric & Manufacturing Company, has been appointed assistant to the commercial vice-president of the Atlantic division of that company.

Mr. James entered the employ of the Westinghouse Company in 1909, in industrial sales work in the Philadelphia office. In 1912 he began to specialize in steel mill electrification, and in 1923 became sales manager of the industrial division. In 1925, he was appointed Middle Atlantic district manager, with headquarters in Philadelphia.

R. R. Davis, who for many years has directed various Westinghouse advertising activities, has been appointed apparatus advertising manager of the Westinghouse Company, at East Pittsburgh. He will have charge of all apparatus advertising activities of the company except the merchandising department, headquarters for which are located at Mansfield, Ohio.

Mr. Davis had been active in the creative as well as the executive side of every form of advertising, its associated mediums and methods, that has been used by the Westinghouse Company.

His service with the company started in 1905, following his graduation as an electrical engineer from the Western University of Pennsylvania, now the University of Pittsburgh. In the next five years, he sought experience in engineering, sales and management, and, for this reason, following a course in engineering apprentice work at East Pittsburgh, went to Philadelphia as an advisory engineer and salesman. For two years he also served as electrical superintendent of the Megargee Paper Company.

In 1910 he became associated with the Westinghouse advertising department, and in the ensuing period had directed the activities and had executive control of most of its divisions. In 1925 he was named assistant to manager of the department and last year became editor-in-chief.

C. E. Stephens, vice-president of the Westinghouse Company has announced the appointment of E. W. Loomis as Middle Atlantic district manager of the Westinghouse organization, with headquarters in Philadelphia. After he was graduated from the University of Delaware in 1914, he entered the student course of the Westinghouse Company at East Pittsburgh. A year later, after completing his training, he was transferred to the sales department in New York. In a few years, he was made manager of the mill and mining section, and later he was appointed manager of the Northeastern industrial division, in which capacity he has recently been serving.

Thomas F. Roche, engineer in charge of track for the Springfield Street Railway, Springfield, Mass., for ten years, has been appointed superintendent of streets, sidewalks and sewers for West Springfield, Mass.

George H. Webb, an employee of the Springfield Railway, Springfield, Mass., since April 2, 1890, and master mechanic since 1895, has been retired after 41 years of service. William L. Harwood, engineer of equipment, succeeds Mr. Webb as master mechanic and retains his position as engineer of equipment.

William H. Duffy has resigned as city service director, Columbus, Ohio, to become secretary of the city sinking fund trustees. Mr. Duffy has been considered the right bower in the Mayor Thomas administration. He entered his present office in January, 1920. Differences between the Mayor and Mr. Duffy appeared during the building of Port Columbus.

Alfred A. Anderson has been elected president and general manager of the Jamestown, Westfield & Northwestern Railroad, the Jamestown Street Railway, the Jamestown Motor Bus Transportation Company, and the Chautauqua Lake Navigation Company, Jamestown, N. Y., succeeding the late George L. Maltby.

M. J. Powers, Denver, at one time master mechanic for the Denver & Rio Grande Railroad, has been named inspector of bus and truck carriers by the Colorado Public Utilities Commission. He succeeds John R. Hamrock, resigned.

John Menietto resigned recently from the East St. Louis & Suburban Railway, East St. Louis, Ill., to accept a position with the Missouri Pacific Transportation Company. Mr. Menietto entered the service of the East St. Louis & Suburban Railway Company about nine years ago in the mechanical department at the car sheds. Later when the company placed buses in service he transferred to the automotive department where he acquired the greater part of his mechanical experience. His new position is that of general foreman of the Missouri Pacific garage at Poplar Bluff, Mo.

Charles E. Skinner, assistant director of engineering, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been elected president of the American Institute of Electrical Engineers for the year beginning Aug. 1, 1931. Announcement to this effect was made at Asheville, N. C., June 22, during the annual summer convention of the Institute.

OBITUARY



Horace Lowry

Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., died on Aug. 22 at his home in that city from a heart attack. He was 51 years old. He is said, by the Minneapolis Tribune, to have overtaxed himself with the press of business affairs last winter.

Mr. Lowry was the son of the late Thomas Lowry, one of the founders of the street railway system in Minneapolis. The elder Lowry took over the presidency of the railway when it was still a struggling corporation, with little or no surplus for extending its operations. As the only son, Horace Lowry, in time, took over the same duties, but under vastly different conditions. He found that the bus was coming into prominence as a means of transportation, and, during his business career, Mr. Lowry encouraged the development of bus lines in the city wherever feasible. In keeping with his desire to provide quick, dependable transportation was the establishment of the Minneapolis-St. Paul intercity bus service. He also was interested in the airplane as a factor in transportation. He declared many times that his company would, when airplane trans-

portation from suburbs to downtown business places became feasible, provide such transportation.

He also advocated, as his particular dream of Twin Cities advancement, the fusion of St. Paul and Minneapolis into one political unit, saying rivalry between St. Paul and Minneapolis businessmen was a constant hindrance rather than a help.

As head of the Arcade Investment Company, he sponsored several building projects, the largest and most recent of which was the block-unit development of the Lowry block in St. Paul. This project, completed at a cost of several million dollars, including a new five-story garage in the center of the block, a complete encircling arcade linking the garage and other new structures with the present Lowry Medical Arts Building and the Hotel Lowry, a new sixteen-story office building on the Fourth Street side of the block, and a new four-story wing addition to the Hotel Lowry.

Mr. Lowry was born in Minneapolis on Feb. 4, 1880. He was graduated from the University of Minnesota with the degree of Bachelor of Science in 1900.

For two years after leaving the university, Mr. Lowry worked as an electrician in the shops of the Minneapolis Street Railway, familiarizing himself with the mechanical operation of the company. He then was appointed to a position in the auditing department where he became chief clerk. This position he resigned to enter the office of his father, taking charge of the latter's real estate interests and acting as personal representative of his father.

In 1908 he resumed active connection with the Minneapolis Street Railway, accepting the superintendency of the Minneapolis division. A year later, on Feb. 4, 1909, his father died and he became head of the Arcade Investment Company, a holding company for the real estate interests of his father. On Dec. 10, 1910, Mr. Lowry resigned from the railway to concentrate his attention on the Arcade Investment Company. He immediately planned and then supervised the construction of the Lowry Building in St. Paul.

On Jan. 1, 1912, he was appointed general manager of the Twin City Rapid Transit Company, which controls the Minneapolis Street Railway and the St. Paul City Railway, and a year later he was elected to the vice-presidency. He continued to act as the second executive officer of the company until 1916 when he was elected president to succeed C. G. Goodrich, who died on Dec. 21, 1915.

At the time of his death, Mr. Lowry was president of the Arcade Investment Company, a director in the Duluth-Superior Traction Company, director in the Soo Railroad, and Northwestern National Bank of Minneapolis.

He was a member of all the leading clubs in Minneapolis and St. Paul as well as a member of the University Club of Chicago. He was a member of the board of trustees of the Minneapolis Institute of Fine Arts.

Uzal H. McCarter

Uzal H. McCarter, president of the Fidelity Union Trust Company, of Newark, the largest bank in New Jersey, one of the founders of the Public Service Corporation of New Jersey, which is headed by his brother, Thomas N. McCarter, and for many years a great financial power in New Jersey, died at his home in Red Bank, N. J., on Aug. 15.

Uzal H. McCarter was born in Newton, N. J., July 5, 1861. His father was then a country lawyer, the descendant of a Scotch-Irish Presbyterian family which settled in New Jersey prior to the American Revolution. Mr. McCarter was educated at Newark Academy, Pingry School, in Elizabeth, N. J., and Princeton, from which he was graduated in 1882. After he was graduated from college, Mr. McCarter went to work for Kidder, Peabody & Company, in New York. Five years thereafter he obtained a position with the Lamboro Investment Company, of New York. While with this company, Mr. McCarter obtained the friendship and then the trust of John F. Dryden, founder of the Prudential Insurance Company, and induced Mr. Dryden to invest a portion of the Prudential funds in bonds handled by the Lamboro Company. That was the start of his rise. In 1889 he moved to Newark as executive manager of the Fidelity Title & Deposit Company, then a small institution less than two years old, with an original capital of \$200,000.

Dr. H. M. Bascom

Dr. H. M. Bascom, for many years chief surgeon of the North American Light & Power Company, the Illinois Power & Light Corporation, Illinois Traction System, and the employees' association, is dead at the age of 78 years, after an operation. Until recently, Dr. Bascom had been in apparently good health, and had maintained his usual schedule of business and professional activities. Dr. Bascom went to Peoria in 1909 to take the position of chief surgeon of the group of utility companies then known as the Illinois Traction System. Later his jurisdiction was extended to include the operating properties of the North American Light & Power Company. Previously, he had practiced medicine in Ottawa, Ill., following his graduation at an early age from the

Hahnemann Medical College of Chicago. As chief surgeon of the Illinois Terminal Railroad System he was an active member of the Association of Railway Chief Surgeons, serving as vice-president in 1926, and as president in 1927. He was also a member of the American Medical Association.

J. L. Agnew

John Lyons Agnew, vice-president of the International Nickel Company of Canada, Ltd., died at his home in Copper Cliff, Ont., recently. Death was due to heart failure in a sudden attack of influenza. Mr. Agnew had just returned to his home from a business trip to New York. He was in charge of the company's operations in both Canada and Great Britain. Born July 28, 1884, Mr. Agnew was brought up in the mining and metallurgical atmosphere of the Pittsburgh district. Going to Canada when he was about 19, he joined the predecessor company—the Canadian Copper Company—at Copper Cliff, Ont., on Feb. 15, 1904. He worked in practically every capacity in the smelting department, eventually becoming smelter superintendent. Subsequently he became general superintendent of the Canadian Copper Company. From then on he held executive positions in the various companies which existed prior to the consolidation in 1929 of these enterprises as the International Nickel Company of Canada, Ltd. At that time he became vice-president of the new company.

Gardner F. Wells

Gardner F. Wells, 60, of New York and Westport, Conn., president of the Boston, Revere Beach & Lynn Railroad, died in his office at Boston on Aug. 21 from gun shot wounds believed to have been self-inflicted.

Mr. Wells also was president of the Interstate Street Railway, with offices at Attleboro, and was a director in other corporations. He was formerly connected with the Old Colony Street Railway, and until 1902 was superintendent of the Brockton & Plymouth Street Railway. In 1902 he was named general manager of the Terre Haute Traction & Light Company. Mr. Wells had been associated with the Boston, Revere Beach & Lynn Railroad since 1927, when the road was electrified and new interests assumed control. Mr. Wells was a member of the engineering and public utility management firm of Hemphill & Wells, New York. His partner, Albert W. Hemphill, is treasurer of the road. A brother, George W. Wells, is a former vice-president.

Gardner F. Wells was born in Quincy, Mass., educated in the Cambridge and Boston schools and then attended Massachusetts Institute of Technology, from which he was graduated in 1891. He became associated with the old Thompson-Houston Company, of Lynn, predecessor of the General Electric Company, and was recognized as an expert in the electrification of horse car lines. He was engaged in work of this kind for ten years in Boston, Fall River, Lowell, Salem, Taunton and other cities.

Mr. Wells became associated with Stone & Webster in 1901, and continued with that firm until March, 1916. During the World War he was a major in the Ordnance Department. At the close of the war, with Albert W. Hemphill, he formed the firm of Hemphill & Wells.

E. C. Foster

Elwin C. Foster, former president of the Manchester Traction, Light & Power Company, Manchester, N. H., and a native of Hancock, died on Aug. 18 in Miami, Fla. He was 78 years old. After his retirement in 1925 he went to Miami and had resided there ever since, but he found time each summer for a trip to Manchester and his native village of Hancock.

From Jan. 1, 1912, until his retirement, Mr. Foster headed the Manchester Company. His retirement preceded the formation of the New Hampshire Public Service Company, in which the Manchester company was merged.

Under his leadership the company enjoyed marked growth and development. Among the many forward steps taken during the period of his presidency were the merging, in 1913, of the Nashua Light, Heat & Power Company with the Manchester company, and the erection, in 1915, of the power plant at Kelley's Falls on the Piscataquog River, and of a substation at Brook Street.

Mr. Foster's connection with the power and railway industries covered a period of 53 years. In that time he rose from the position of street car conductor to the presidency of one of the largest power companies in New England.

In May, 1922, power and railway officials from all over New England paid homage to Mr. Foster at Manchester as he celebrated his 50th anniversary as a street railway man.

In 1872, a youth of 19, he became a street railway conductor at Lynn, Mass. In various capacities he continued with this company and its successors for 31 years. In 1903 he went to New Orleans as president of the New Orleans Railway & Light Company, and remained there seven years.

Bruce Ford, inventor, engineer and authority in the storage battery field, died on Aug. 10 in Philadelphia. He was in his 59th year. Mr. Ford was second vice-president and a director of the Electric Storage Battery Company, of which until recently he had been general manager. After serving two years with the Electric Storage Battery Company, Mr. Ford spent six years at Johnstown, Pa., with the Johnson Company and the Lorain Steel Company, but returned to the battery company in 1899 as engineer in charge of development and design. He registered more than 50 patents on inventions in the storage battery field.

Harry C. Wells, court claim agent of the United Railways & Electric Company, Baltimore, died on Aug. 10 at Radford, Va., where he was spending the summer. He had been in ill health for some time. Mr. Wells, who was 63 years old, had been connected with the street railway company in Baltimore for 39 years, 30 of which he was court claim agent.

Eugene Schmoeger Gould, only son of Lawrence E. and Martha E. Gould, of Chicago, died at Petoskey, Mich., on Aug. 5 from a heart attack while bathing in Little Traverse Bay. The son of the president of the Economy Electric Devices Company, Eugene Gould was graduated with high honors this spring from Milford School, Milford, Conn., and planned to enter Hobart College, Geneva, N. Y., this fall. He is survived only by his parents.

INDUSTRY MARKET AND TRADE NEWS



One hundred buses of this type are part of an order recently placed for service in Brooklyn

Brooklyn Bus Order Placed

Following the approval of its franchise, orders for equipment have been placed by the Brooklyn Bus Corporation, the new subsidiary of the Brooklyn-Manhattan Transit Corporation formed to operate bus lines in the Borough of Brooklyn. The contract was given to the Twin Coach Corporation.

Of the 150 buses purchased, 100 will be 40-passenger Twin Coaches. These will be of the standard urban type, with minor modifications to meet the purchaser's requirements. The 50 smaller buses, which will seat 27 passengers, are a new development of the Twin Coach Corporation. They are similar in general appearance to the larger model, but have only one engine and employ a differential drive. A more complete description of this bus appears in this issue, page 482.

Allis-Chalmers Widens Field by Acquisition of Two Companies

Announcement is made by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., of the acquisition of the principal assets of the American Brown Boveri Company, Inc., and the capital stock of Condit Electrical Manufacturing Corporation, Boston, Mass. By this purchase, Allis-Chalmers secures several new lines of equipment, such as electric railway apparatus, mercury arc rectifiers, and oil circuit breakers.

After completing the manufacture of material on order at Camden, N. J., the operations now carried on by the American Brown Boveri Company, Inc., will be segregated. The large apparatus departments and work, with substantially the same personnel, will be transferred to the Allis-Chalmers plants at Milwaukee and Pittsburgh, while the remainder will be moved to the plant of the Condit Electrical Manufacturing Corporation at Boston, Mass. The Allis-Chalmers district and branch sales offices will, in the future, serve as the main outlet for the former American Brown Boveri products.

The corporate entity, the organization, plant and product of the Condit Electri-

cal Manufacturing Corporation, for 31 years manufacturers of oil circuit breakers, will be retained as at present. With few exceptions, the present sales connections of the Condit Electrical Manufacturing Corporation, throughout the United States, will be continued.

Trolley Bus Purchases Active

Recent orders for trolley buses placed with the J. G. Brill Company show evidence of an increasing appreciation of the place of this modern vehicle in urban transportation. Among these are:

Five for the Illinois Power & Light Company for service in Peoria.

Four for the United Electric Railways, Providence, R. I.

Two for the Duluth Street Railway, Duluth, Minn.

Five for the Shreveport Railways, Shreveport, La.

All of these are of the standard 40-passenger type except those for Shreveport, which seat 30 passengers.

Another evidence that the trolley bus is destined to be a growing factor in future public transportation is recognized in the larger number of this type of vehicles that will be exhibited at the coming convention of the American Electric Railway Association.

Signal Contract for Union Switch & Signal

The Board of Transportation of the City of New York has awarded the Union Switch & Signal Company, equipment contract S-3, involving the installation of automatic block signals and interlocking equipment for the line between Fulton Street, Manhattan, and Church Avenue, Brooklyn. This section includes approximately 25 track-miles, of which 1 mile is on elevated structure, 5 miles of tube construction, and the balance, two-, three- and four-track subway construction. The work involves 500 color light signals, 50 electro-pneumatic switches, and 332 electro-pneumatic train stops. Approximately half of these signals and all the switches will be controlled by four electro-pneumatic interlocking machines with a total of 140 levers.

Memphis Orders Nine Trolley Buses

An order for nine trolley buses, with a seating capacity of 40 each, has been placed by the Memphis Street Railway with the St. Louis Car Company. These vehicles will replace the present Lamar Avenue car line, and will operate along 9.9 miles of route. Approximately 7,000 ft. of double track is to be taken up. The trolley buses are to be delivered about Oct. 1, and the service will be inaugurated about Oct. 15, 1931.

The body framing will have straight sides and rounded corners. The front end will be reduced in width to permit a greater angle of approach to the street curb for loading. The main controller will be located under the rear seat, and the master controller and reverser will be located in a weatherproof cabinet under the center of the vehicle.

The motors, air compressors and resistors are to be placed under the floor, as are the master controller and reverser, between two transverse baffle plates that will extend from side sheet to side sheet and reach to within 12 in. of the ground, with a 6-in. flexible apron on the bottom. All wiring, except the leads to the master control, reverser, motors, air compressor and resistors, will be run in a cable box on the closed side of the vehicle.

Additional detail specifications of the trolley buses follow:

Length over bumpers.....	33 ft.
Wheelbase.....	193 in.
Width over all.....	98 $\frac{1}{2}$ in.
Height, floor to ceiling.....	Front end, 82 $\frac{1}{2}$ in.; Rear end, 78 $\frac{1}{2}$ in.
Post spacing.....	38 $\frac{1}{2}$ in.
Body.....	All steel
Doors.....	Front and rear ends
Air brakes.....	Westinghouse
Compressors.....	Westinghouse DH-10
Control.....	General Electric, PCM
Door mechanism.....	National Pneumatic Co.
Doors.....	Outwardly folding
Fare boxes.....	Ohmer No. 3 type
Floor covering.....	Battleship linoleum
Hand rails.....	Micarta and chrome plated
Heaters.....	Railway Utility Co.
Lamp fixtures.....	Dome type
Motors.....	General Electric No. 1154
Roof material.....	No. 10 cotton duck
Seats.....	Karpen Manufacturing Co.
Seating material.....	No. 1 machine buffed leather
Seat spacing.....	Front, 10.50-22 in. Rear, 9.75-22 in.
Tires.....	Railway Utility Co.
Ventilators.....	

Bendix-Westinghouse Moves Detroit Office

Bendix-Westinghouse Automotive Air Brake Company, of Pittsburgh, Penn., announced the removal of its Detroit office, formerly located at 7-255 General Motors Building, to 8-211 in the same building. By this move, Bendix-Westinghouse will share office space with the Bendix Aviation Corporation, whose address has been established in the General Motors Building for some time. R. L. Morrison will continue his regular duties as district sales manager for Bendix-Westinghouse in the Detroit area, and has added to his staff three new associates, namely, A. E. Young, representative; George S. Sarver, representative; and R. H. Casler, field engineer.

Bus Deliveries

Brooklyn Bus Corporation, Brooklyn, N. Y., 50 Twin Coach, Model 40.

Central Transportation Company, Chicago, Ill., one Yellow Coach, 21-passenger city type.

Columbia Railway, Gas & Electric Company, Columbia, S. C., two Twin Coach, Model 30.

Delaware Bus Company, Philadelphia, Pa., four Yellow Coach, 29-passenger city type.

Illinois Power Company, Springfield, Ill., three Yellow Coach, 21-passenger city type.

Interstate Power Company, Dubuque, Iowa, 25-passenger city type.

Kansas City Public Service Company, Kansas City, Mo., fifteen Twin Coach, Model 30.

Louisville Railway, Louisville, Ky., two White, Model 65A.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., four Yellow Coach, 25-passenger city type.

Mississippi Valley Public Service Company, Milwaukee, Wis., two Yellow Coach, 21-passenger city type.

Southern Pennsylvania Bus Company, Philadelphia, Pa., three Yellow Coach, 29-passenger city type.

Springfield Traction Company, Springfield, Mo., two Yellow Coach, 21-passenger city type.

Tennessee Public Service Company, Knoxville, Tenn., two Twin Coach, Model 30.

United Service Company, Tulsa, Okla., two Yellow Coach, 21-passenger city type.

Washington Railway & Electric Company, Washington, D. C., eight Yellow Coach; four 21-passenger, and four 29-passenger city type.

West Ridge Transportation Company, Girard, Pa., one Yellow Coach, 29-passenger observation type.

Material Prices

AUGUST 26, 1931

Metals—New York

Copper, electrolytic, delivered, cents per lb.	7.75
Lead.....	4.40
Nickel, ingot.....	35.00
Zinc.....	4.15
Tin, Straits.....	26.37
Aluminum, 98 to 99 per cent.....	22.90
Babbitt metal, warehouse	
Commercial grade.....	34.50
General service.....	28.75

Track Materials—Pittsburgh

Standard steel rails, gross ton.....	\$43.00
Track spikes, $\frac{1}{4}$ -in. and larger, per 100 lb.....	\$2.70
Tie plates, steel, cents per 100 lb.....	1.95
Angle bars, cents per 100 lb.....	2.75
Track bolts, per 100 lb.....	3.90
Ties, 6m.x 8m.x 8 ft.,	
White Oak, Chicago.....	1.21
Long leaf pine, New York.....	1.00

Waste—New York

Waste, wool, cents per lb.....	11.00
Waste, cotton (100 lb. bale), cents per lb.,	
White.....	7.00-11.00
Colored.....	7.00-10.00

Wire—New York

Bare copper wire, cents per lb.....	9.50
Rubber-covered wire, No. 14, per 1,000 ft.....	\$4.09
Weatherproof wire base, cents per lb.....	11.37

Paint Materials—New York

Linseed oil (5 bbl. lots), cents per lb.....	8.50
White lead in oil (100lb. keg), cents per lb.....	13.25
Red lead in oil.....	14.75
Turpentine (bbl. lots), cents per gal.....	38.00
Putty, com'l grade, 100 lb. tubs, cents per lb.....	5.50

Hardware—Pittsburgh

Wire nails, per kg.....	\$1.90
Sheet iron (24 gage), cents per lb.....	2.40
Sheet iron, galvanized (24 gage), cents per lb.....	2.90
Auto body sheets (20 gage), cents per lb.....	3.10
Fender stock (20 gage), cents per lb.....	3.20

Bituminous Coal

Pittsburgh mine run, net ton.....	\$1.35
Central Ill. screenings.....	.80
Kansas screenings, Kansas City.....	1.20
Big seam, Ala., mine run.....	1.70
Smokeless mine run, Chicago.....	1.60

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade I, per thousand.....	\$120.00
Wood block paving 3 $\frac{1}{2}$ x 16 lb. treatment, N.Y., per sq.yd., f.o.b.....	2.50
Paving brick, 3x8x4, N.Y., per 1,000 in. carload lots, f.o.b.....	50.00
Paving brick, 3x8x4, N. Y., per 1,000 in. carload lots, f.o.b.....	45.00
Crushed stone, 1-in., wholesale, f.o.b. per cu.yd.....	1.80
Cement, Chicago, in carload lots, without bags, f.o.b.....	1.35
Gravel, 1-in., cu.yd., wholesale, f.o.b.....	1.60
Sand, cu.yd., wholesale, f.o.b.....	1.00
Asphalt, in pkg. N.Y., f.o.b. ref. per ton.....	16.00

Scrap—New York

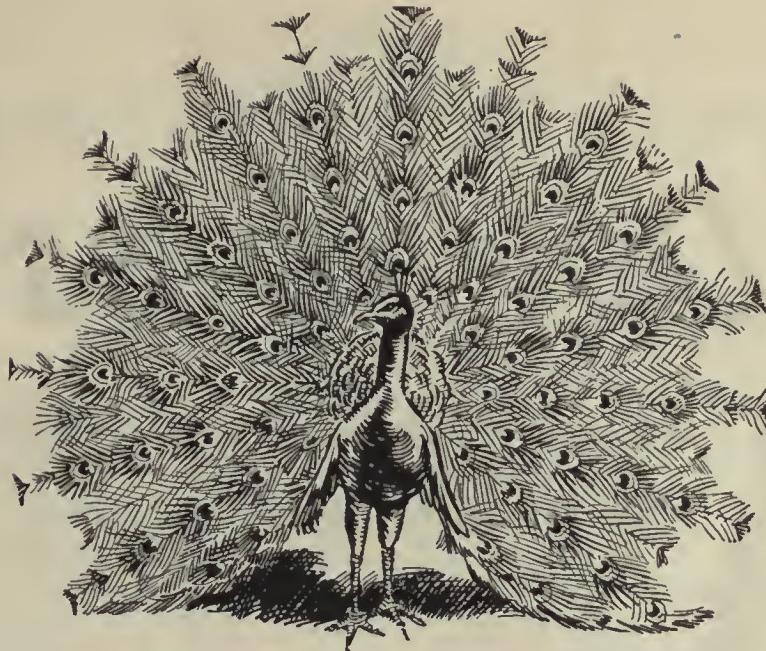
Heavy copper, cents per lb.....	6.12
Light copper.....	5.12
Heavy brass.....	3.12
Zinc.....	1.50
Lead, heavy.....	3.10
Mixed babbitt.....	3.25
Battery lead plates.....	1.37
Cast aluminum.....	6.75
Sheet aluminum.....	8.25
Auto radiators.....	3.12
Tires, standard, mixed, per ton.....	\$3.12
Iron tubes, mixed, per cwt.....	\$1.20

Old Material—Chicago

Steel car axles, net ton.....	\$12.25
Cast iron car wheels, gross ton.....	9.75
Steel car wheels, gross ton.....	9.00
Leaf springs, cut apart, gross ton.....	10.50
Angle bars, gross ton.....	9.50
Brake shoe, net ton.....	6.00
Steel rails (short), gross ton.....	11.25
Relaying rails, gross ton (65 lb. and heavier)	24.50
Machine shop turnings, gross ton.....	4.25
Coil springs, per gross ton.....	10.75
Frogs, switches and guards cut apart, per gross ton	8.25

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street

railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 121 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.



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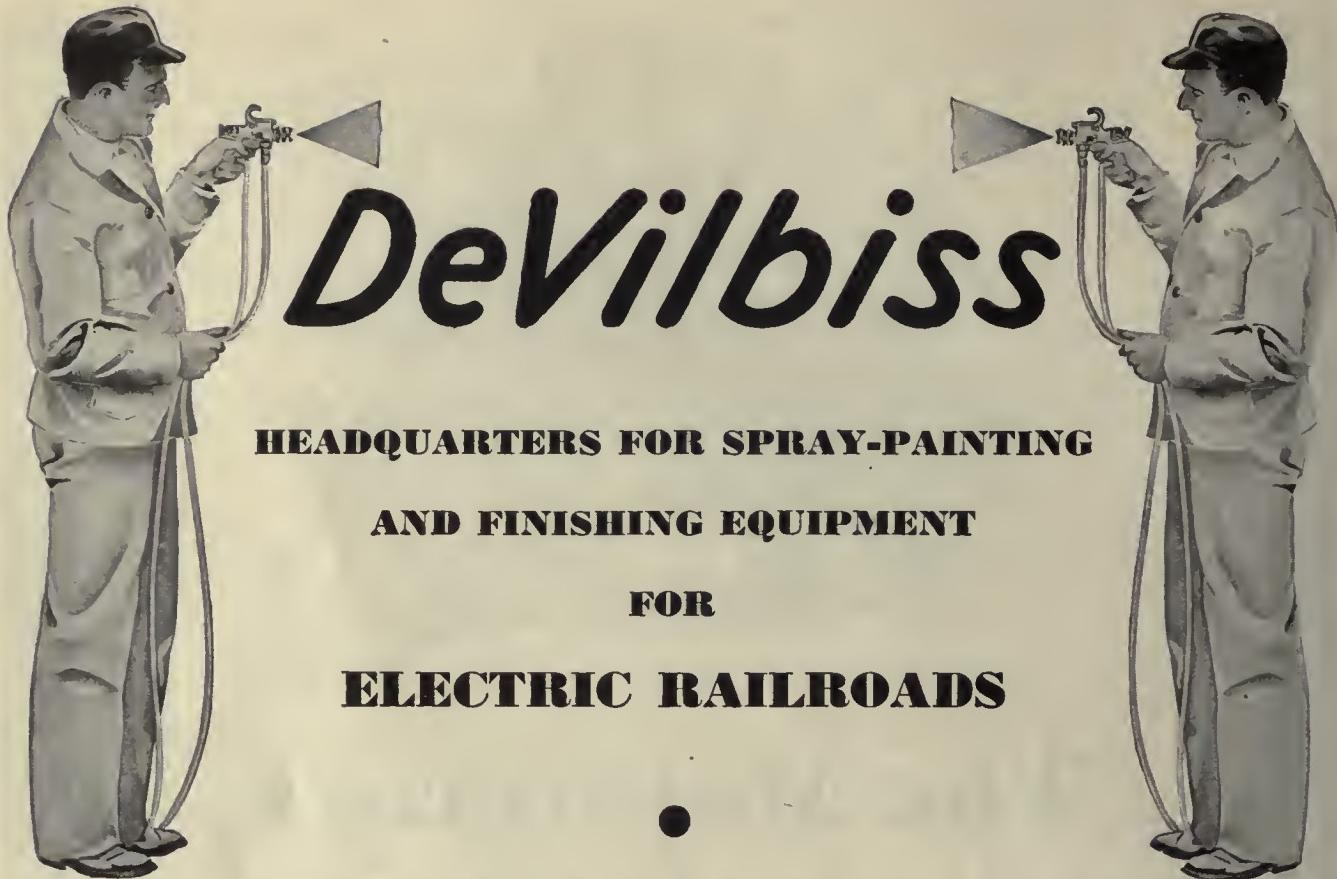
Are direct, emphatic, sure in action. Fast on the take up, lots of power, never clog with chain, no matter how slack the rigging may be. *They stop cars* when they are called into action.



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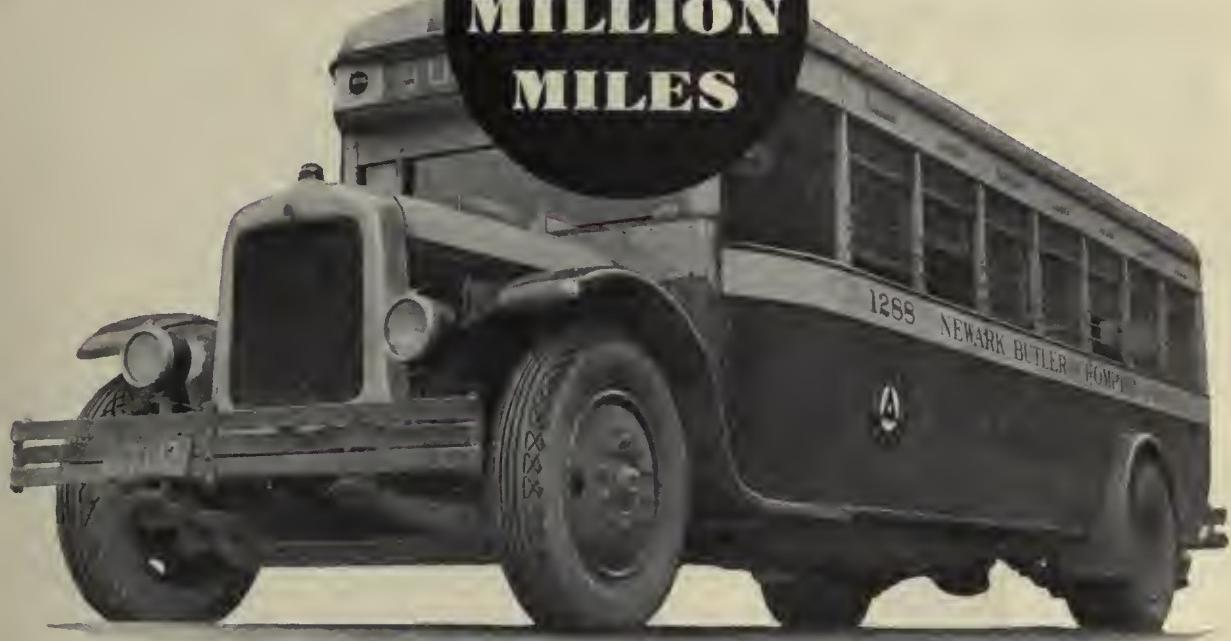
Direct sales and service representatives available everywhere

The wide DeVilbiss Line embraces every outfit and accessory for spray-painting and spray-finishing



SINCE 1924 IN TRAFFIC

**357
MILLION
MILES**



more than 1½ BILLION passengers

Such figures stagger the imagination. The first is equal to 14,280 times around the world! The second is only a little short of the total population of the earth! Yet these impressive totals are actual miles traveled and passengers carried in the past seven years by the largest motor coach operation in the United States — in that period over 90% on Goodyears!

That operation is the Public Service Coordinated Transport with its subsidiary the Public Service Interstate Transportation Company — jointly operated from Newark, N. J. 2,436 coaches are employed in the service. The territory covered in New Jersey, New York, and Pennsylvania, is the most

heavily congested district as to traffic on earth. More brake applications are required here on more station and traffic stops than in any other service. There have been minimum road failures on Goodyears. Over an extended period of years, on an overall test including thousands of coach units, on every point of stamina, traction, cushioning, and public safety there has been maximum satisfaction with the Goodyear Tire.

It is a straight-shooting fact, and for good reason, that "more people ride on Goodyear Tires than on any other kind." Both for motor coaches and passenger cars it is the leading make of tire. On all your coaches you can have this quality — specify Goodyears.

GOOD  **YEAR**

T H E G R E A T E S T N A M E I N R U B B E R

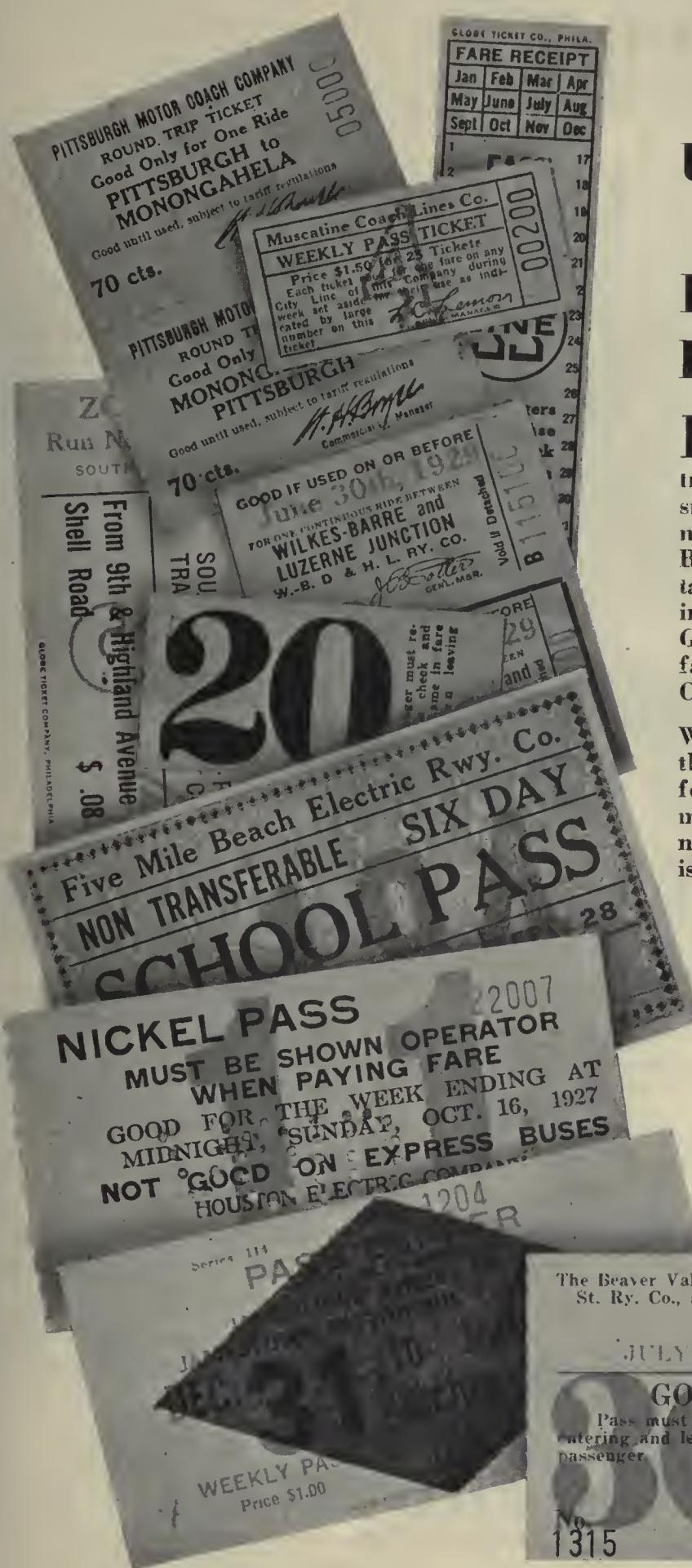


INSULATING MATERIALS

The dependability of electrical apparatus is determined often by the quality of its insulating materials. General Electric, to insure this dependability, manufactures the Insulating Materials used in its many products. These same Insulating Materials that are manufactured, used, and recommended by the General Electric Company can be obtained from your nearest General Electric Merchandise Distributor. See him, or write Section M-319, Merchandise Department, Bridgeport, Conn.

GENERAL ELECTRIC
INSULATING MATERIALS

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT



ARE YOU USING THESE REVENUE- INCREASING FARE HELPS?

PRACTICALLY all of the larger traction companies in this country are using Globe Transfers to insure maximum revenue return and minimum losses at transfer points. But not all of these companies are taking advantage of the equally important cash-in-advance value of Globe Passes, and the sure, simple fare check afforded by Globe "Hat Checks" and zone Fare Receipts.

We strongly urge you to investigate the numerous advantages of these forms. Our entire facilities and many years of experience as "the nation's transportation fare specialists" are at your service.

GLOBE TICKET COMPANY

112 North Twelfth Street
PHILADELPHIA

Additional Factories in

Los Angeles Boston New York
Jacksonville

Sales Offices
Baltimore Cincinnati Cleveland
Pittsburgh

The Beaver Valley Traction Company, Pittsburgh & Beaver St. Ry. Co., and Beaver Valley Motor Coach Company

WEEKLY PASS
JULY 26, 1928 TO JULY 29, 1928

GOOD IN ALL ZONES

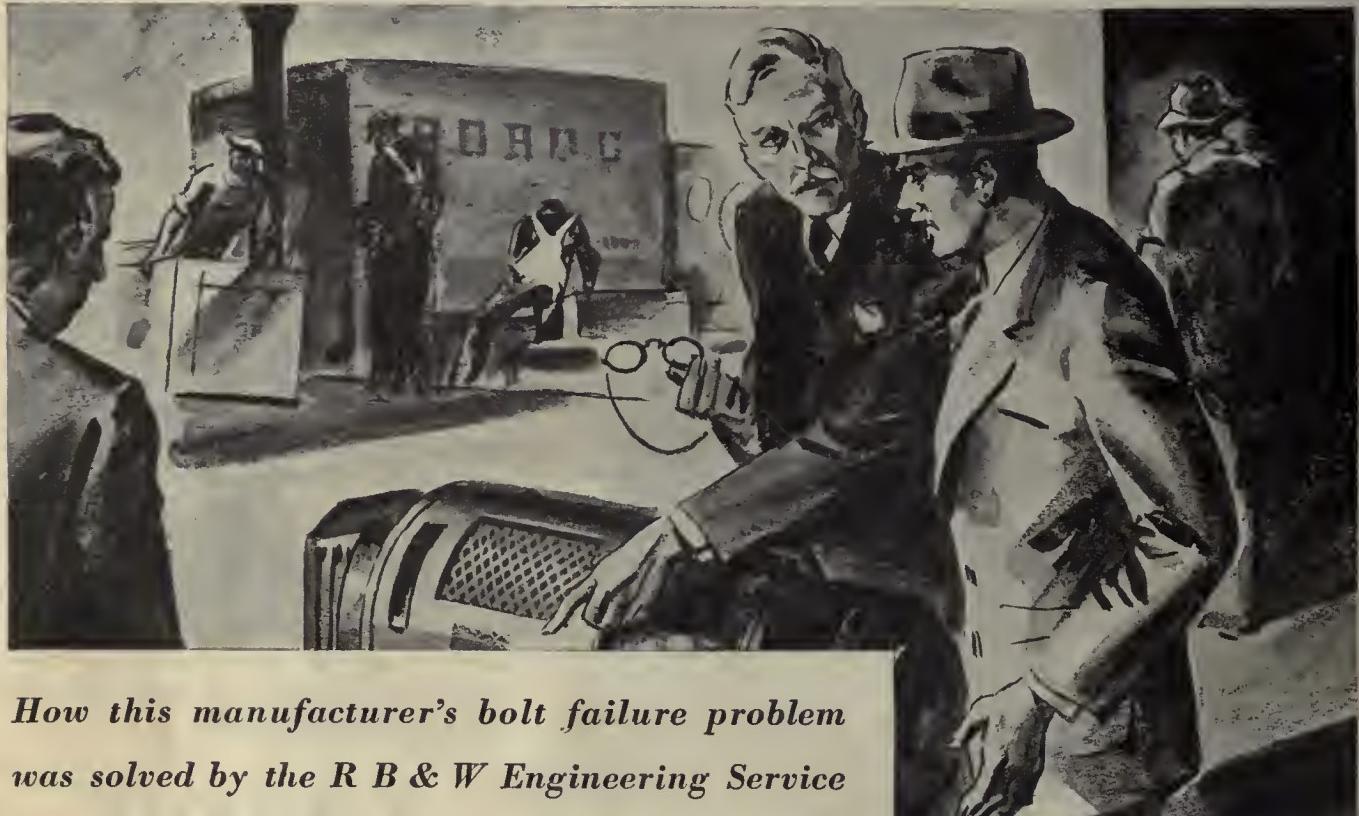
Pass must be shown to the conductor or operator upon entering and leaving the car and is good for only one (1) passenger

Price, \$2.00

J. R. MARSHALL,
Sup't of Transportation.

No. 1315

HE FORGOT... TO FIGURE INITIAL STRESS



*How this manufacturer's bolt failure problem
was solved by the R B & W Engineering Service*

"Bolts still failing. Rush new shipment. Must have higher tensile strength." Thus wired a customer. And then the R B & W Engineering Service got busy.

The customer was a builder of a portable electric machine used in construction work. He was using bolts to attach the heavy machine assembly to the frame of a trailer truck. We had tested specimens of his bolts before shipment and they had

shown 86,000 pounds, so the next thing to do was to make an on-the-spot investigation.

We discovered that the customer, when estimating the strength of the bolts he needed, had forgotten to allow for the initial stress placed on the bolts when his machine was assembled. The bolting together of the

parts exerted a stress, which, when increased by service loads, exceeded the capacity of his bolts. A slight increase in diameter of the bolts eliminated his trouble.

The skilled engineer, and the layman as well, can utilize the specialized knowledge of bolting material available without obligation through the R B & W Engineering Service. Send us your problems.



RUSSELL, BURDSALL & WARD BOLT & NUT CO.

ROCK FALLS, ILL.

Sales Offices at Philadelphia, Detroit, Chicago, San Francisco, Los Angeles, Seattle, Portland, Ore.

PORT CHESTER, N. Y.

CORAOPOLIS, PA.



100

40 passenger
Twin Coaches
for
Brooklyn -
New York City's
greatest residential
Borough

The Nation's greatest

through the Brooklyn Bus Corporation,
of the great Brooklyn &



Selects 100 Dual
for 5 reasons

transportation center

motor coach subsidiary

Queens Transit Corporation



Motor Twin Coaches

IDER APPEAL

NON OBSOLESCENCE

CIRCULATING LOADS

CAPACITY

POWER



Interior view of forty-passenger Twin Coaches being shipped to Brooklyn, showing use of new pass meter, or turnstile, expected to materially increase average speed



\$1,100,000 Brooklyn Bus Order Approved by Commission

The New York Transit Commission on July 30 granted the application of the Brooklyn Bus Corporation, a subsidiary of the Brooklyn & Queens Transit Corporation, to issue \$1,100,000 in notes to pay for 100 buses purchased from the Twin Coach Corporation, of Kent, Ohio. In its decision the commission says that it found no evidence that the price of \$11,000 a vehicle, proposed to be paid, was too high. It points out that the vice-president of one of the leading competitors of the Twin Coach Corporation had testified on the stand that the price for which the Brooklyn Bus Corporation had contracted was "in line" with prices asked by the bus manufacturers generally for practically the same type of bus.

*From August 1st issue
Electric Railway Journal News*

Twin Coach
BY F.R. PAGEOL KENT, OHIO

The SAFETY CAR CONTROL EQUIPMENT

Speeds Transportation SAFELY ▲ ▲ ▲ ▲ ▲ ▲ ▲

When conditions impel shorter headway to reduce waiting time of patrons . . . quicker brake applications to reduce stopping time . . . rapid interchange of passengers to cut down standing time . . . prompt release of brakes to permit quick get-away . . . THEN the Safety Car Control Equipment, with all of the latest improvements, will speed up service while maintaining the basic element of safety.

**SAFETY CAR DEVICES CO.
OF ST. LOUIS, Mo.**

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO

SAN FRANCISCO

NEW YORK

WASHINGTON

PITTSBURGH



B.M.T. goes



Approach to Manhattan Bridge, New York.
Tying up traffic here on account of tire
trouble is a serious, punishable offense.
... Note the B. M. T. bus in the foreground.

Goodrich

Another B. F. Goodrich Product

Goodrich - 100%

Gigantic metropolitan bus system standardizes on Silvertowns after 18-month test period

5:30 P. M. Rush hour. Seething crowds pour into subways...jam street cars...elevated trains...every available means of transportation...

Manhattan Bridge—huge connecting link between Manhattan and Brooklyn—becomes a focal point of the world's heaviest traffic.

Here, at this "bottle-neck" you'll find B. M. T. buses—delivering thousands of Brooklynites. Day in—day out—traveling on clocked schedules—over Manhattan Bridge—capacity loads—with never a hitch.

Surely, this is a crucial test of tire

One of a hundred new Goodrich-equipped buses just delivered to the B. M. T. by the Twin Coach Company, of Kent, Ohio.

equipment. Yet, since using Silvertowns B. M. T. has never had a single road delay on the Manhattan Bridge due to tire failure.

The B. M. T. (Brooklyn Bus Corporation) selected Goodrich Silvertowns as best meeting the require-

ments of their heavy duty service only after a rigid eighteen-month test period during which they tried out several makes of tires. Silvertowns are now standard equipment on every B. M. T. bus.

Whether your buses travel in heavy city traffic or on fast cross-country hauls, you'll find Silvertowns the best answer to your tire requirements.

The B. F. Goodrich Rubber Company, Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, California. In Canada: Canadian Goodrich Company, Limited, Kitchener, Ontario. The International B. F. Goodrich Corporation (Export).



HEAVY DUTY



Silvertowns

SPECIFY GOODRICH ON YOUR NEW BUSES

This month —

GOLDEN JUBILEE CONVENTION NUMBER

1881

1931

The CONVENTION NUMBER of *Electric Railway Journal* will be mailed to subscribers September 15. It will also be distributed at Atlantic City. It will be much more than an ordinary convention issue. The history of the Journal is the history of the industry, and this issue will reflect that fact. It will be an invaluable historical document that every one interested in community transport will want to read and keep.

GOLDEN JUBILEE CONVENTION NUMBER

Mailed Sept. 15 — Forms close Sept. 11

and next month—

CONVENTION REPORT NUMBER

THE BIG SHOW is coming in less than a month. The 50th meeting—Golden Jubilee—of the A.E.R.A. An event that comes but once in an industry's lifetime.

Important industry executives will be at Atlantic City during the week of September 26-October 2. Important features will distinguish this year's Exhibit—in the great Atlantic City Auditorium—displays recalling the industry's fifty years of progress, as well as the latest modern equipment. And this year, for the first time, the National Association of Motor Bus Operators will hold their annual meeting during the same week, at the same place.

The CONVENTION REPORT NUMBER of *Electric Railway Journal* will bring you a full and accurate account of all the important happenings at Atlantic City during this busy week. It will preserve in permanent form a record of this Golden Jubilee meeting—a record both interesting and valuable to every man connected with the electric railway industry.

CONVENTION REPORT NUMBER

Mailed Oct. 10—Forms close Oct. 2



THE FINEST POLE · · IN 50 YEARS OF AERA HISTORY



In Topeka, Kas., Union Metal Poles support trolley span wires, street lights and traffic signals. Note absence of guy wires

BACK in the horse-car days there was no need for poles for trolley-span wire support. With the advent of electric cars poles became a necessity. Those used in the early days were crude compared with the Union Metal Fluted Poles of today. Sturdy, graceful, dignified, these poles do their work efficiently and at the same time beautify the streets.

When the A. E. R. A. celebrates its centennial in 1981 Union Metal Poles now in service will still line the curbs of American cities.

Fluted Poles have been termed the ideal for street railway service. They are rugged, long-lived; their flexibility enables them to carry abnormal wind or ice loads without taking a permanent set; they are simple to install and maintain; moreover, their appearance, far superior to any other pole, helps build good will for the owners.

Progressive street railway companies in dozens of our largest cities are using Union Metal Poles. They realize that in the 50 years of A. E. R. A. history no finer pole has been built.

THE UNION METAL MANUFACTURING CO., General Offices and Factory: CANTON, OHIO

Sales Offices: New York, Chicago, Boston, Los Angeles, Atlanta,
Dallas, San Francisco

• Distributors: Graybar Electric Company, Inc.; General Electric Merchandise Distributors. Offices in all principal cities.

Abroad: The Canadian General Electric Co., The International General Electric Co., Inc.



UNION METAL DISTRIBUTION POLES





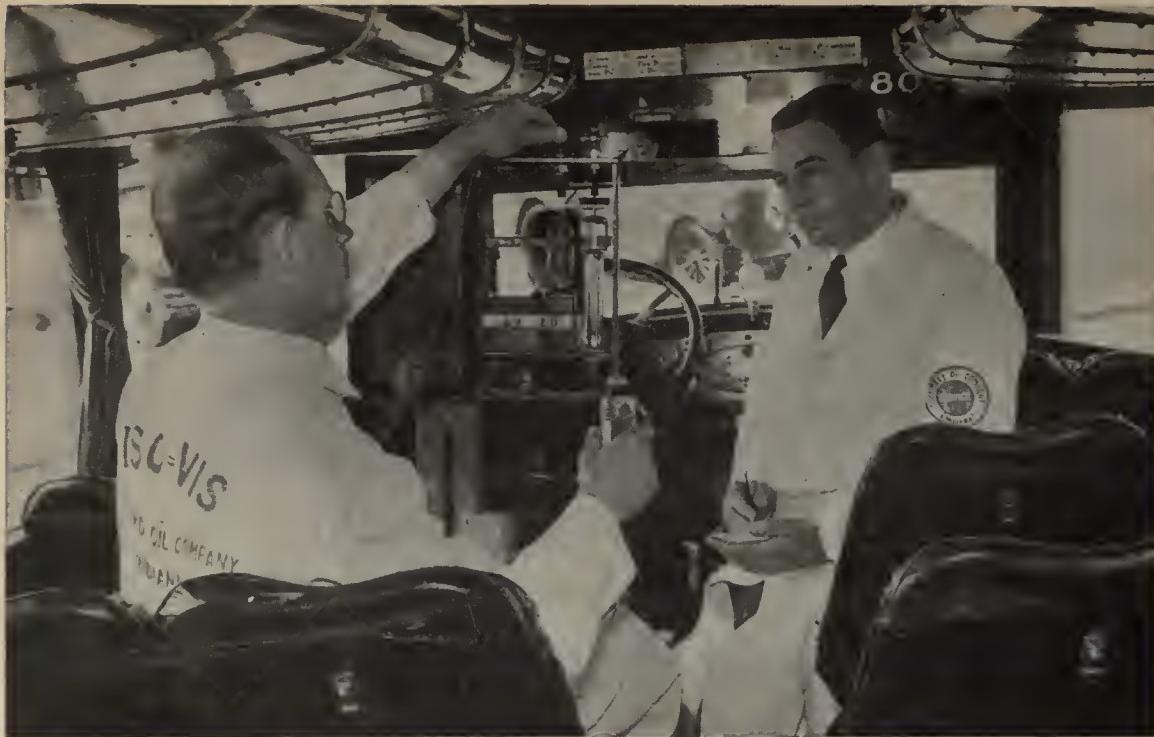
CAR CARD
ADVERTISING
ALMOST
EVERWHERE

TENS of millions ride the Electric Railway Lines every day. This tremendous group of buyers is steadily being influenced to increase their purchase of car card advertised products. Thus Car Card Advertising helps to sustain business.

Consider what might happen if these tens of millions were not given attractive, forceful suggestions and timely reminders to buy day in and day out, rain and shine.

Is it any wonder that Car Card Advertising has the active endorsement of the Electric Railway Operators?

Barron G. Collier
INCORPORATED



These Combustion Engineers have cut fuel costs for many operators.

HOW much would a 17% increase in motor fuel mileage save you in a year? How much would it be worth to you to reduce obnoxious odors in your motor coaches? And wouldn't you like to receive better lubrication from motor oil?

These are some of the problems which motor coach combustion engineers of the Standard Oil Company (Indiana) are solving for Midwestern motor coach operators. The efficiency of hundreds of motor coaches has been greatly increased by these engineers . . . and as the operating efficiency was increased the motor fuel cost and the amount of obnoxious combustion odors released were

decreased. A check taken of twenty-five of these motor coaches picked at random from different companies shows an average saving of 17% in motor fuel mileage and 42% less carbon monoxide.

It may be also possible to improve your gasoline mileage and lower motor fuel costs. Your motor coaches serviced by Standard Oil Company (Indiana) combustion engineers and using Red Crown Gasoline and Polarine Motor Oil will be as efficient and economical as perfect gasoline and motor oil performance can make them. Call in one of these motor coach engineers. His investigation places you under no obligation.

STANDARD OIL COMPANY
(Indiana)

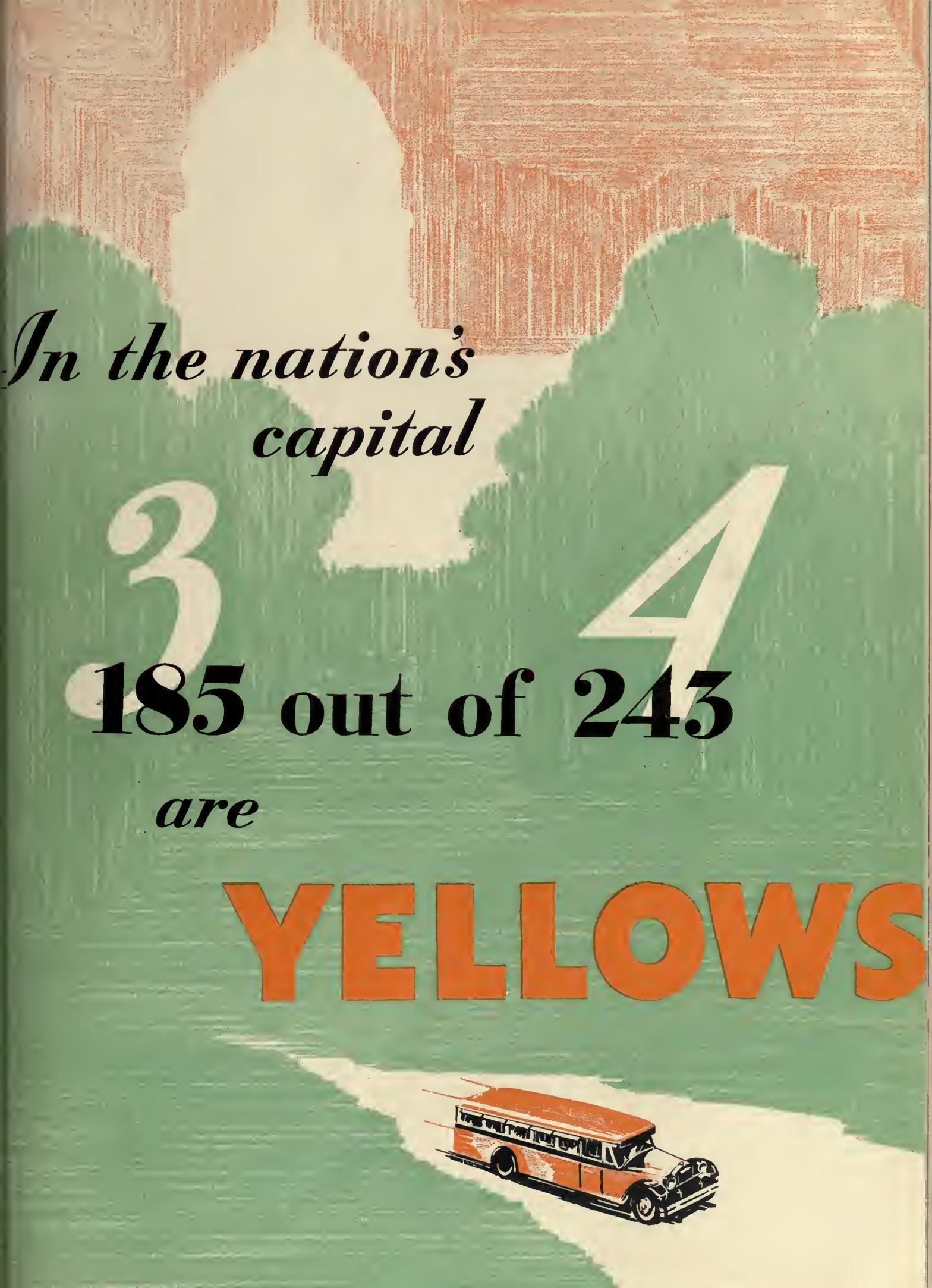
910 So. Michigan Avenue

1208-B

Chicago, Illinois



MATCHED TO GIVE  PERFECT PERFORMANCE



*In the nation's
capital*

3

4

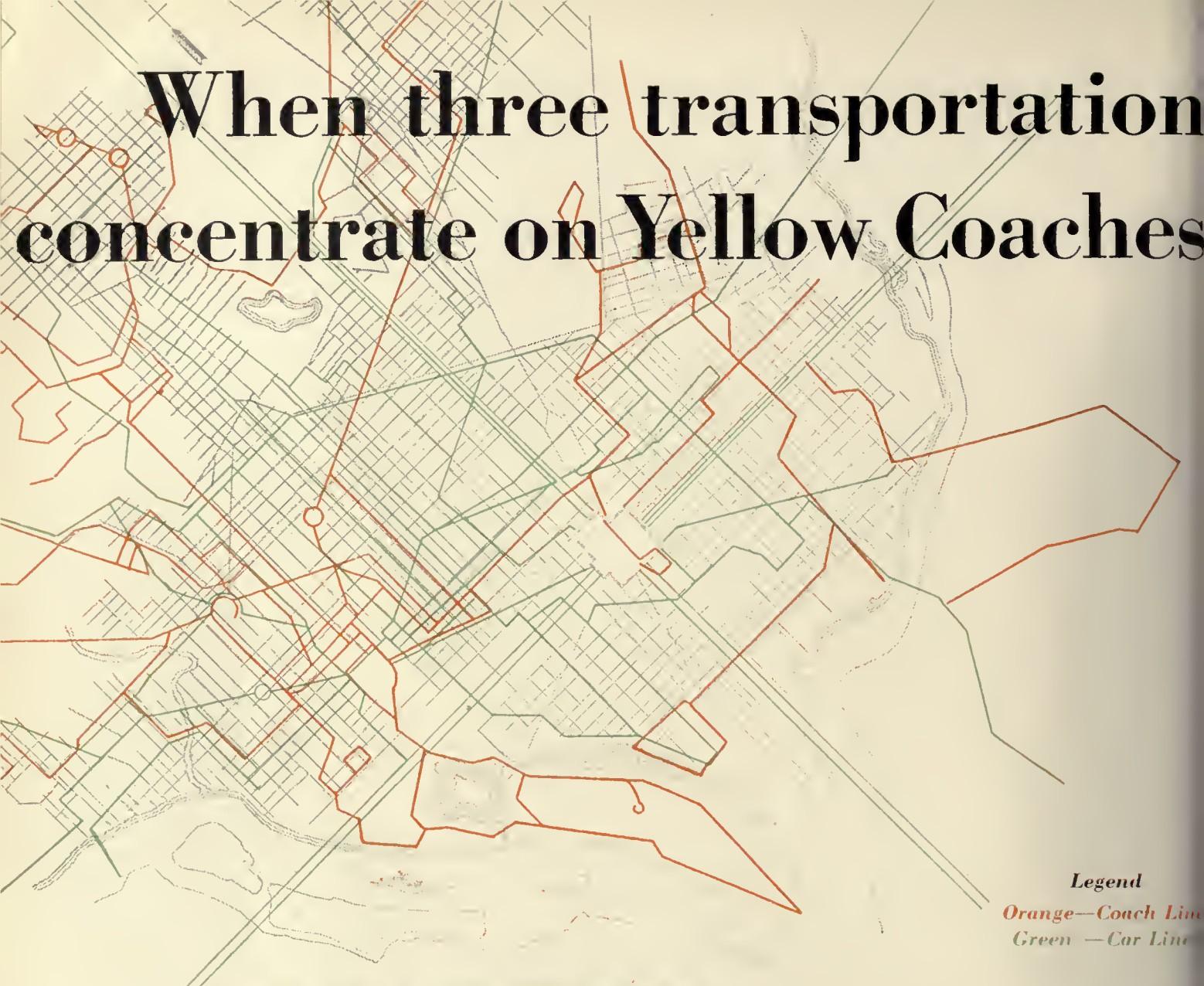
185 out of 243

are

YELLOWS



When three transportation concentrate on Yellow Coaches



The Washington Railway and Electric Company operate 128 motor coaches—107 of them are Yellows



companies in the same city —there's a reason —

When three progressive operators, giving in some instances parallel service, all specialize on one make of motor coach and individually prove their preference by reorders, *there must be more to such a united policy than mere chance.*

When three different companies, in the same city, all keyed to make the strongest bid for passengers, agree on Yellow Coaches it proves that it *takes a Yellow to compete with a Yellow.*

This is the situation in Washington, D. C., where automobile registration per 1000 population is greater than in any other Eastern city and where only the best and most comfortable motor coach service can hope to win.

Comparative figures tell their own story—

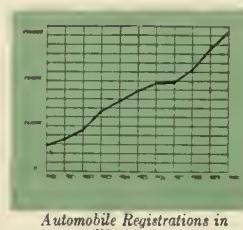
The Washington Railway and Electric Company, the largest system and operating both street cars and motor coaches, owns 107 Yellow Coaches in a fleet of 128 motor vehicles.

The Capital Traction Company, the second largest operator of street cars and coaches, owns 31 Yellows in a fleet of 47.

The Washington Rapid Transit Company, operating motor coaches only, uses 47 Yellow Coaches in a fleet of 68.

Three out of four coaches in Washington are Yellows. And all Yellow Coaches purchased in 1925 have given over 300,000 miles of service each—in perfect condition and operating every day.

Washington's three transportation companies have made the Nation's Capital a Yellow Coach city and a profitable one for motor coach operation.



Motor coach service must be comfortable, convenient and efficient to meet this competition



The Capital Traction Company operate 47 motor coaches—31 of them are Yellows



The Washington Rapid Transit Company operate motor coaches only. They have a fleet of 68 coaches—47 of them are Yellows



It takes a YELLOW to compete with a YELLOW!

- In addition to the outstanding qualities of comfort and convenience rendered by Yellow Coaches in Washington, they have been remarkably economical on all three operations.

The operating figures on equipment purchased as early as 1925 shows an economy of operation which today is almost unbelievable.

	Gas and Oil Cents	Tires Cents	Chassis and Body Repairs Cents	Total Cents
Type Y Yellows, After 300,000 Miles Each, in Express Service. Purchased in 1925				
1925	3.18	1.75	.82	5.85
1926	3.92	1.75	1.99	7.66
1927	3.08	1.45	1.74	6.27
1928	3.04	1.03	2.41	6.48
1929	3.00	1.10	2.50	6.60
1930	2.41	.93	1.78	5.12
52 Type Z-29 pass. Yellows in Local City Service. Purchased 1925 - 1928				
1926	4.709	1.936	2.129	8.774
1927	4.417	1.493	2.524	8.434
1928	4.027	1.410	2.653	8.090
1929	3.953	1.360	3.115	8.428
1930	3.420	1.061	2.640	7.121
18 Type X - 21 pass. City Service Yellows Purchased 1925 - 1928				
1926	2.770	1.843	1.851	6.464
1927	2.663	.947	1.882	5.492
1928	2.590	.884	2.141	5.615
1929	2.542	.839	2.595	5.976
1930	2.212	.811	2.865	5.888

- No wonder the record of purchases of motor coaches in Washington, D. C., is a record of repeat orders for Yellow Coaches.

Reorders by the three Washington transportation companies show that since the first purchase in 1925, Yellow Coaches have predominated in all years. The record follows—

Prior to	Yellow Coaches	Orders	Other Makes
1925	0	0	27
1925	22	7	16
1926	23	8	0
1927	56	9	2
1928	31	9	2
1929	26	6	0
1930	19	5	7
1931	8	1	4
	185	45	58

- And carrying forward the reorder policy 4 Type W-21 passenger Yellow City Coaches and 4 additional Z-29 Yellow Coaches have just been shipped to the Washington Railway and Electric Company.

GENERAL MOTORS TRUCK CO.
Pontiac, Michigan

Subsidiary of Yellow Truck & Coach Mfg. Co.



Long Life in a Severe Service



THE Interborough Rapid Transit Company of New York City operates Subway cars a maximum of 458 miles per day and Elevated cars 368 miles per day, with 1 minute and 48 seconds minimum headway on the west side during the rush hours. There was a total of 1,324,156,313 passengers carried over its lines during the year ended December 31st, 1930. Safety and long life are necessary conditions for their rolled steel wheels. They employ a most rigid wheel specification and inspection system which depends upon an exact system of records. Naturally, only the best of wheels are reordered by this road. We are proud to be continuously supplying them with Standard Steel Wheels.



STANDARD STEEL WORKS COMPANY

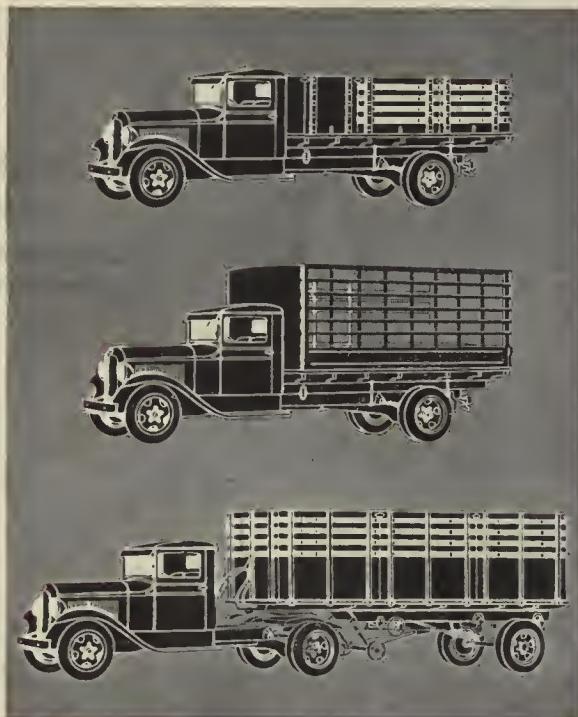
GENERAL OFFICE & WORKS: BURNHAM, PENNA.

CHICAGO
NEW YORK
PHILADELPHIA

ST. LOUIS

AKRON
PORTLAND
SAN FRANCISCO

Biqgest, Strongest, Longest Lasting truck in the lowest price class



1. Heavy full floating rear axle designed for dualing.
2. Dual wheel equipment at slight extra cost.
3. Heavy 7" channeled frame.
4. 4-speeds forward transmission.
5. Big truck engines—4 or 6 cylinder.
6. Chrome nickel cylinders—wearing 7 times longer than grey iron.
7. Maximum piston displacements—205 inches in the 4 cylinder, 214.7 inches in the 6 cylinder.
8. Heavy steering spindles.
9. Full pressure lubrication—even to piston pins.
10. Five bearing crankshaft in the 4 cylinder; Seven bearing in the 6 cylinder.
11. More loading space on frame back of cab.
12. Weatherproof hydraulic brakes.
13. Heavy Duty Spoksteel wheels.

Comparative specifications prove the new SPEED WAGON is bigger, has stronger parts, more bearings, better lubrication and finer materials, proving in advance its longer life! As a matter of record, no other truck costing up to double the SPEED WAGON price has equal specifications!

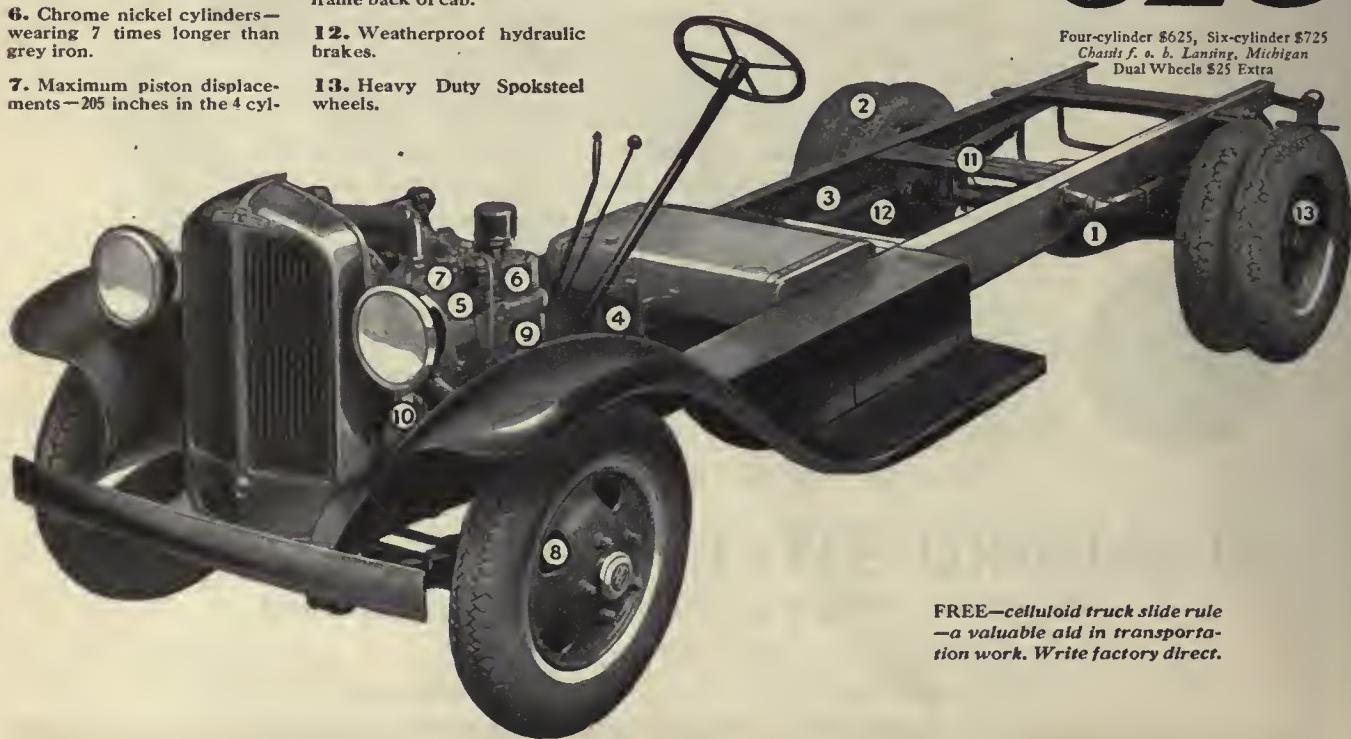
Reo-made bodies, suiting the haulage requirements of the Railway Industry, are engineered to the chassis, matched and mounted at the Reo factory. For further information call your Reo dealer, or write

REO MOTOR CAR COMPANY · LANSING · TORONTO

THE NEW $\frac{1}{2}$ TON

REO **SPEED**
WAGON **625**

Four-cylinder \$625, Six-cylinder \$725
Chassis f. o. b. Lansing, Michigan
Dual Wheels \$25 Extra



FREE—celluloid truck slide rule—a valuable aid in transportation work. Write factory direct.



The car on the left stops to open switch then passes through and stops in position of car on the right to close switch. These two stops are eliminated by the 3-in-1 Switch Stand.

THREE is a tremendous annual cost at the ends of double track and on passing sidings where cars must stop to operate a switch. The calculated annual cost per car for this stopping and starting is large; when multiplied by each operating car the figure becomes staggering. It can be magnified further by considering the time on every schedule sacrificed to switch operation.

Such an expense is unnecessary. The Racor 3-in-1 Switch Stand combines in a single unit an automatic return after trailing car has passed, an oil buffer preventing return between successive pairs of wheels, and a rigid-throw always ready for hand operation. Cars approaching the 3-in-1 and having the right-of-way pass with safety to the car and switch points. The target, rigidly attached, always showing the exact position of the points, is a reliable factor of safety.

Write today for complete printed information about the 3-in-1, a modern and mechanically efficient Switch Stand.



RAMAPO AJAX CORPORATION

Racor Pacific Frog and Switch Company Los Angeles—Seattle
Canadian Ramapo Iron Works, Limited . . . Niagara Falls, Ontario

General Offices—230 Park Avenue, New York

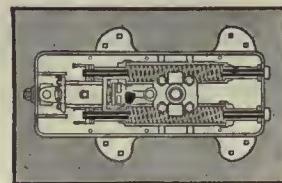
*Sales Offices at Works, and McCormick Bldg., Chicago—Midland Bank Bldg., Cleveland, Ohio
Metropolitan Bank Building, Washington Builders Exchange Building, St. Paul*

*Nine Racor Works: Hillburn, N. Y., Niagara Falls, N. Y., Chicago, Ill., East St. Louis, Ill.,
Superior, Wis., Pueblo, Cal., Los Angeles, Cal., Seattle, Wash., Niagara Falls, Ont.*

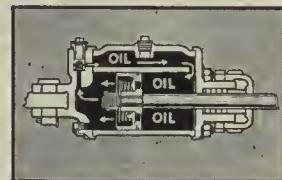
Stops

AT THE ENDS OF
DOUBLE TRACK

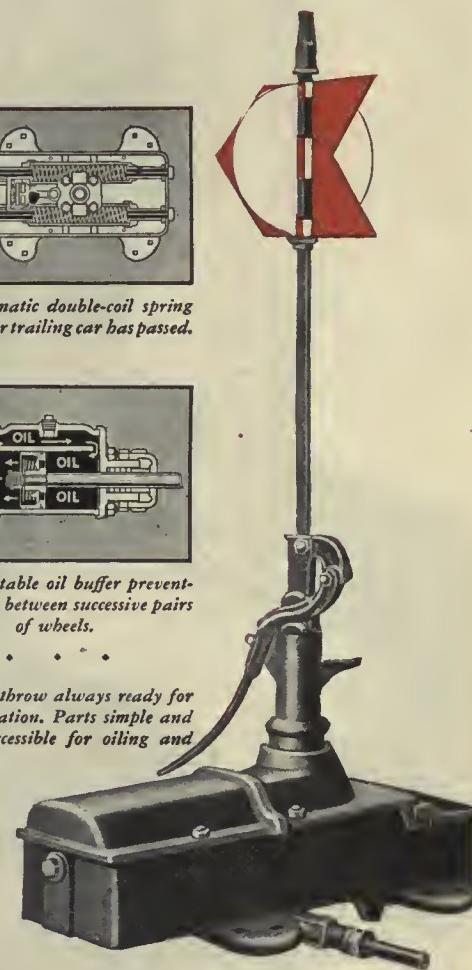
COST
MILLIONS
ANNUALLY



The automatic double-coil spring return after trailing car has passed.

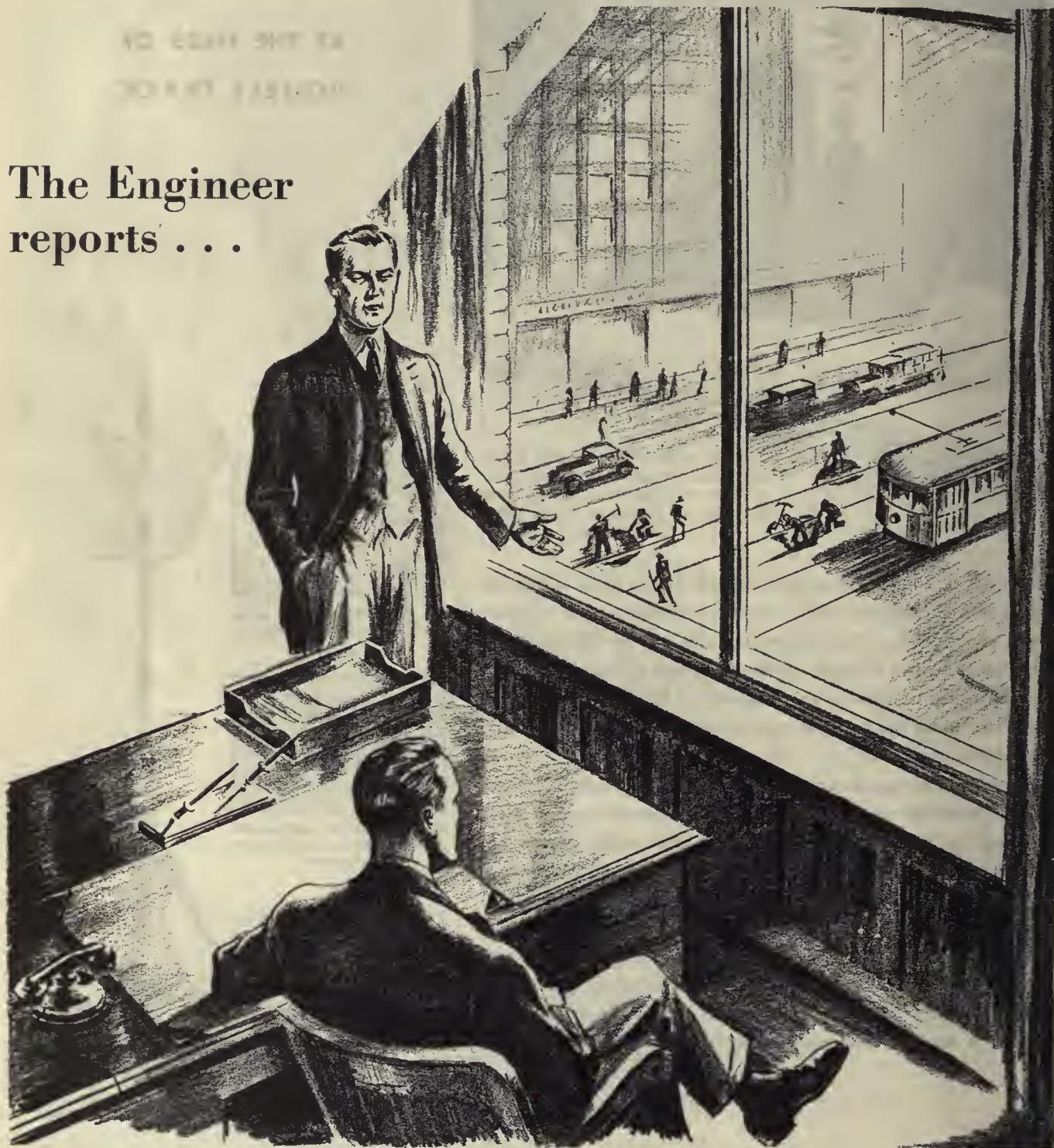


The adjustable oil buffer preventing return between successive pairs of wheels.



"Yes Sir, this

The Engineer
reports . . .



The
METAL & THERMIT

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. San Francisco

Toronto

will be the last time!"

WE'VE patched those joints too many times already! And now the City Engineer is beginning to kick about giving us permits to open up the pavement again. He says he's getting complaints from everybody along the street.

"So we've decided to Thermit weld them! You know how well that other piece of new track has stood up that we put in with Thermit welds three years ago. It's got twice as many cars going over it, and not one joint's gone bad since it was laid.

"At the last Convention, several of the Boys told me that they had been Thermit welding old track, as well as new, and it just about ends all their joint troubles. So we're going to do it here, too.

"No! We're not going to re-route the cars. We're not going to weld at night, either. The new method of Thermit-Welding-Under-Traffic solves that problem. The cars are seldom delayed—never for more than three minutes even under the heaviest traffic and then only at the time the weld is being poured. No temporary bridges or switches to go over, either. The cars stay right on their own rails.

"The best part of it is that the cost will be little, if any more than the usual patching jobs we've been doing so often. You've got to hand it to Thermit, because in the last few years the process has been improved and the cost reduced so much that we really can't afford to do anything else."

It will pay to fix up the old track now. It can be done easier and cheaper than ever. The process of welding-under-traffic was developed as a result of years of research work and costly experiments. Now it is in regular use on many electric railways. Welding-under-traffic is an exclusive process of the Metal & Thermit Corporation, and is fully covered by patents.

"We've patched these joints too many times"

"So we've decided to Thermit weld"

"just about ends all their joint troubles"

"welding under traffic solves the problem"

"they've improved the process and reduced the cost . . ."



CORPORATION

120 Broadway, New York, N. Y.

Pittsburgh

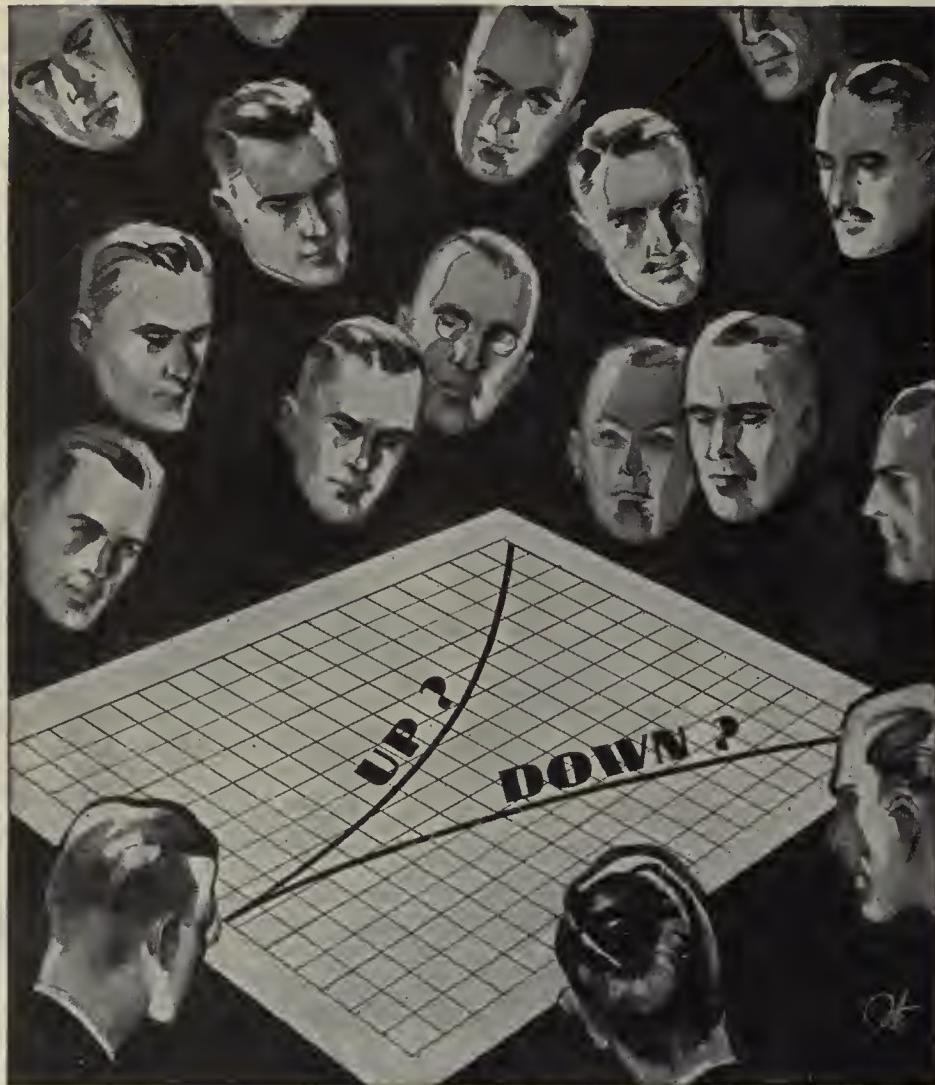
Chicago

Albany

So. San Francisco

Toronto

ALWAYS . . .



. . . THE COST!

THERE is an opportunity for alert railway management today. Costs must be brought down. Waste must be eliminated. Even such apparently minor details as lubrication are receiving executive attention. • The influence of anything less than completely effective lubrication is far-reaching. The Texas Company has introduced an entirely new system of car-journal lubrication that has completely eliminated older excessive lubrication costs. Texaco engineers with the new Texaco System, working in cooperation

with railway shop officials, have effected substantial economies. • Important power savings have been accomplished, reduced wear on equipment, the reduction of idle car-time overhead, lower oil house costs, reduced waste consumption and other operating savings. • Results with the new Texaco System, of which Texaco Lovis Oil and Texaco Oil Seals are the major elements, have completely demonstrated its economy and effectiveness. Tests on your own road will substantiate it. Write The Texas Company.

TEXACO



LUBRICANTS

THE TEXAS COMPANY, 135 East 42nd St., New York City

DAVIS "ONE-WEAR" STEEL WHEELS



What Does
It Cost
After You've
Bought It?

This is the question to ask
about wheels.

With the Davis "One-Wear" Steel
Wheel the first cost is the last.

Contour conditioning and all its
attendant expense never troubles
the Davis Wheel.

Special composition steel triple heat
treated, provides unique qualities
that are characteristic only in the
Davis Wheel and make them truly
"One-Wear."

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST.LOUIS

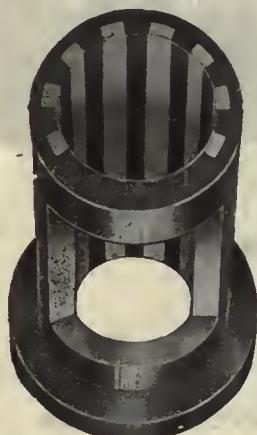
NATIONAL ELECTRIC RAILWAY SPECIALTIES



"More-Jones"
Trolley Wheels
and Harps



"Tiger" Bronze Axle and
Armature Bearings



The "Vigne"
Bimetallic Armature
Bearing

WHATEVER your plans are for replacement or modernization you can be sure of successful and economical results by including "National" Electric Railway Specialties. Submit your problems to us.



"Armature" Babbitt Metal

NATIONAL Bearing Metals Corporation

ST. LOUIS, MO.

New York, N. Y.
Meadville, Pa.

Jersey City, N. J.
Portsmouth, Va.

Pittsburgh, Pa.
St. Paul, Minn.

News

brief, late news flashes for
the electric railway industry

To supplement the service of the regular monthly issues of *Electric Railway Journal*, a separate NEWS service appears on thirty-nine Saturdays during the year. This supplement keeps you in touch with court decisions . . . fare increases . . . new ordinances . . . association meetings . . . financial statements . . . equipment purchases.

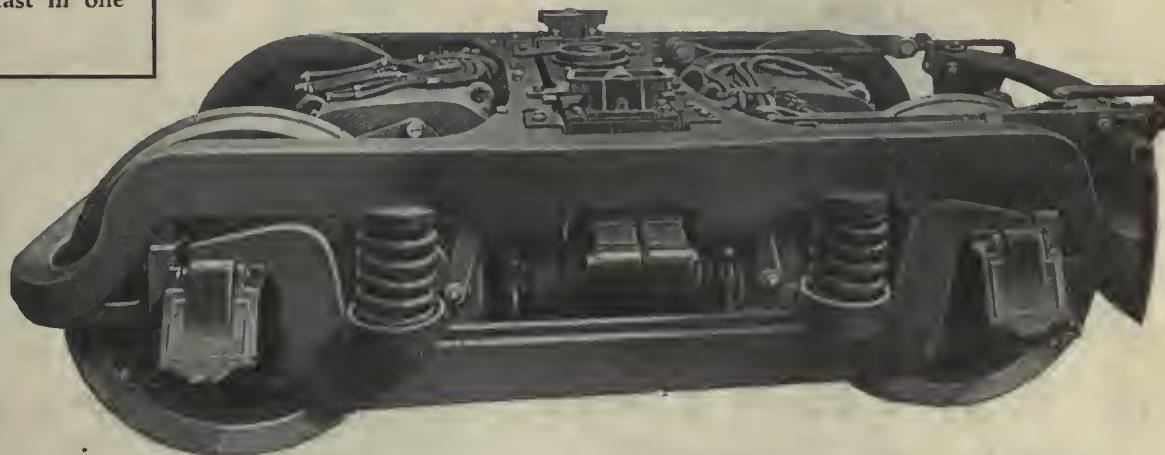
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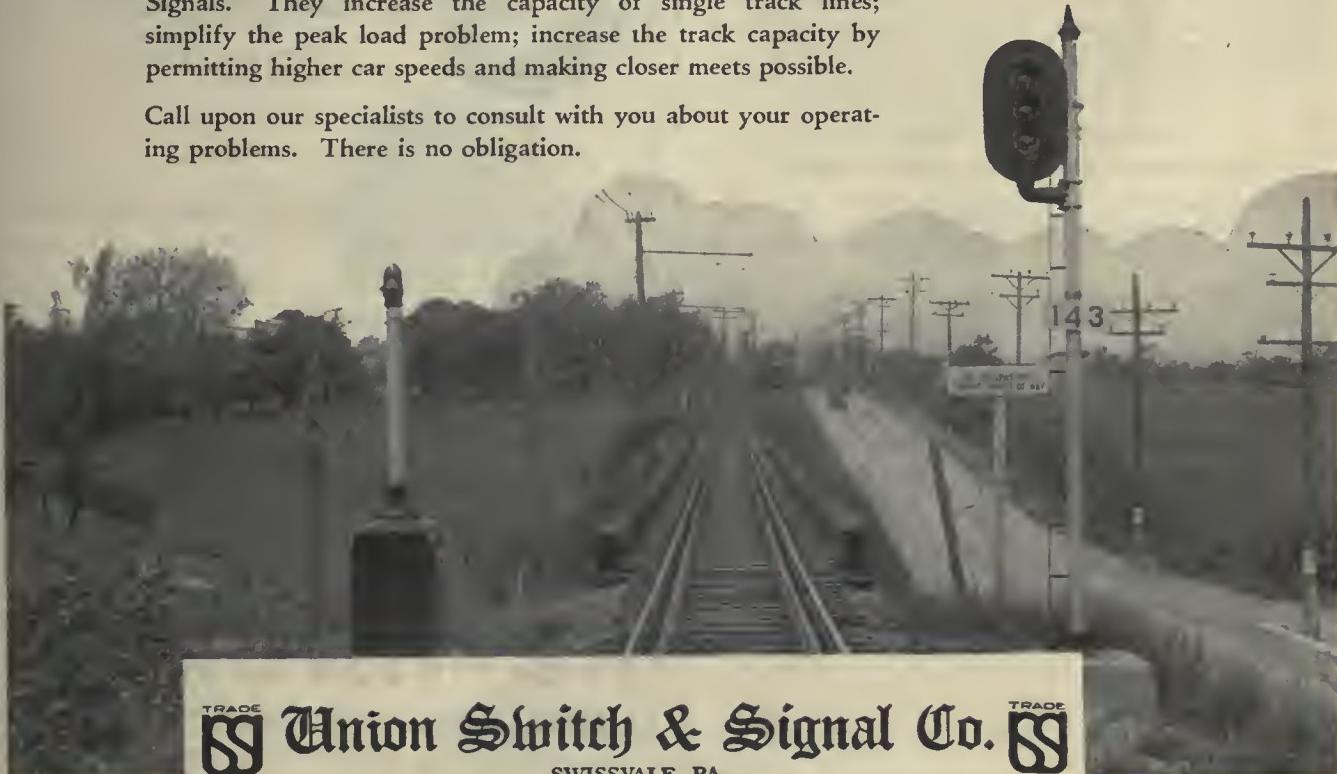
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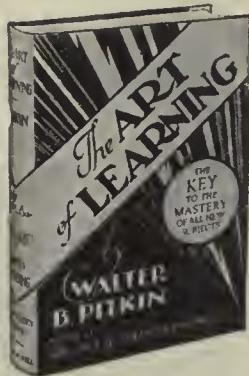
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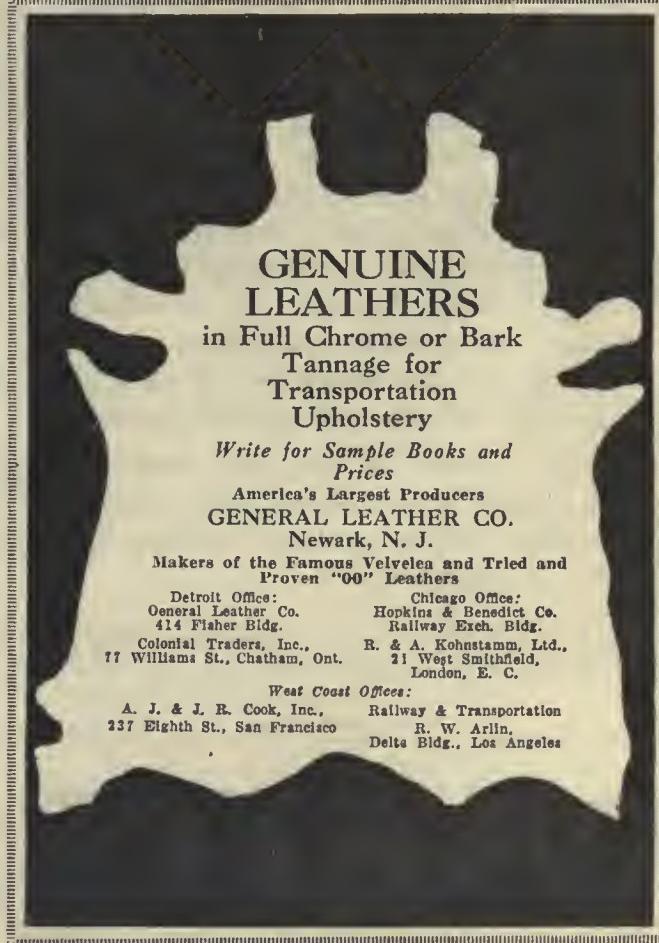
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ALPHABETICAL INDEX.

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	Page
Allied Engineers	44
American Car Co.	Third Cover
American Steel Foundries	39
Beeler Organization	44
Bibbins, J. Roland	44
Brill Co., The J. G.	Third Cover
Buchanan & Laying Corp.	44
Bylesby Eng. & Manag. Corp.	44
Collier, Inc., Barron G.	27
Consolidated Car Heating Co.	45
De Vilbiss Co., The	12
Electric Service Supplies Co.	8
General Electric Co.	10 & 14
General Leather Co.	45
General Motors Truck Co.	Insert 29-32
General Steel Castings Co.	41
Globe Ticket Co.	15
Goodrich Rubber Co., The B. F.	22-23
Goodyear Tire & Rubber Co.	13
Hemingray Glass Co.	42
Hemphill & Wells	44
Jackson Lumber Co.	43
Jackson, Walter	44
Kelker, Jr., R. F.	44
Kuhlman Car Co.	Third Cover
Louisville Frog, Switch & Signal Co.	45
McGraw-Hill Book Co., Inc.	42
Metal & Thermit Corp.	36-37
Nachod and U. S. Signal Co.	42
National Bearing Metals Corp.	40
National Brake Co., Inc.	11
National Pneumatic Co.	9
Oakite Products, Inc.	46
Ohio Brass Co.	6-7
Railway Track-work Co.	4
Railway Utility Co.	43
Ramapo Ajax Corp.	35
Reo Motor Car Co.	34
Richey, Albert	44
Russell, Burdsall & Ward Bolt & Nut Co.	16
Safety Car Devices Co.	21
Sanderson & Porter	44
Searchlight Section	47
Standard Oil Co. (Indiana)	28
Standard Oil Co. of New York	48
Standard Steel Works Co.	33
Star Brass Works, The	43
Texas Co., The	38
Timken-Roller Bearing Co.	Back Cover
Twin Coach Corp.	Front Cover & Insert—17-20
Union Metal Mfg. Co., The	26
Union Switch & Signal Co.	41
Wason Mfg. Corp.	Third Cover
Westinghouse Elec. & Mfg. Co.	Second Cover
Westinghouse Traction Brake Co.	5
Wish Service, The P. Edw.	44
Yellow Coach	Insert 29-32
 <hr/>	
Searchlight Section — Classified Advertising	
BUSINESS OPPORTUNITIES	
EQUIPMENT (Used, etc.)	
Detroit, City of	47
Eastern Mass. St. Ry. Co.	47
Perry, Buxton, Doane Co., The	47
Shenandoah Traction Co.	47
POSITIONS VACANT AND WANTED	
	47

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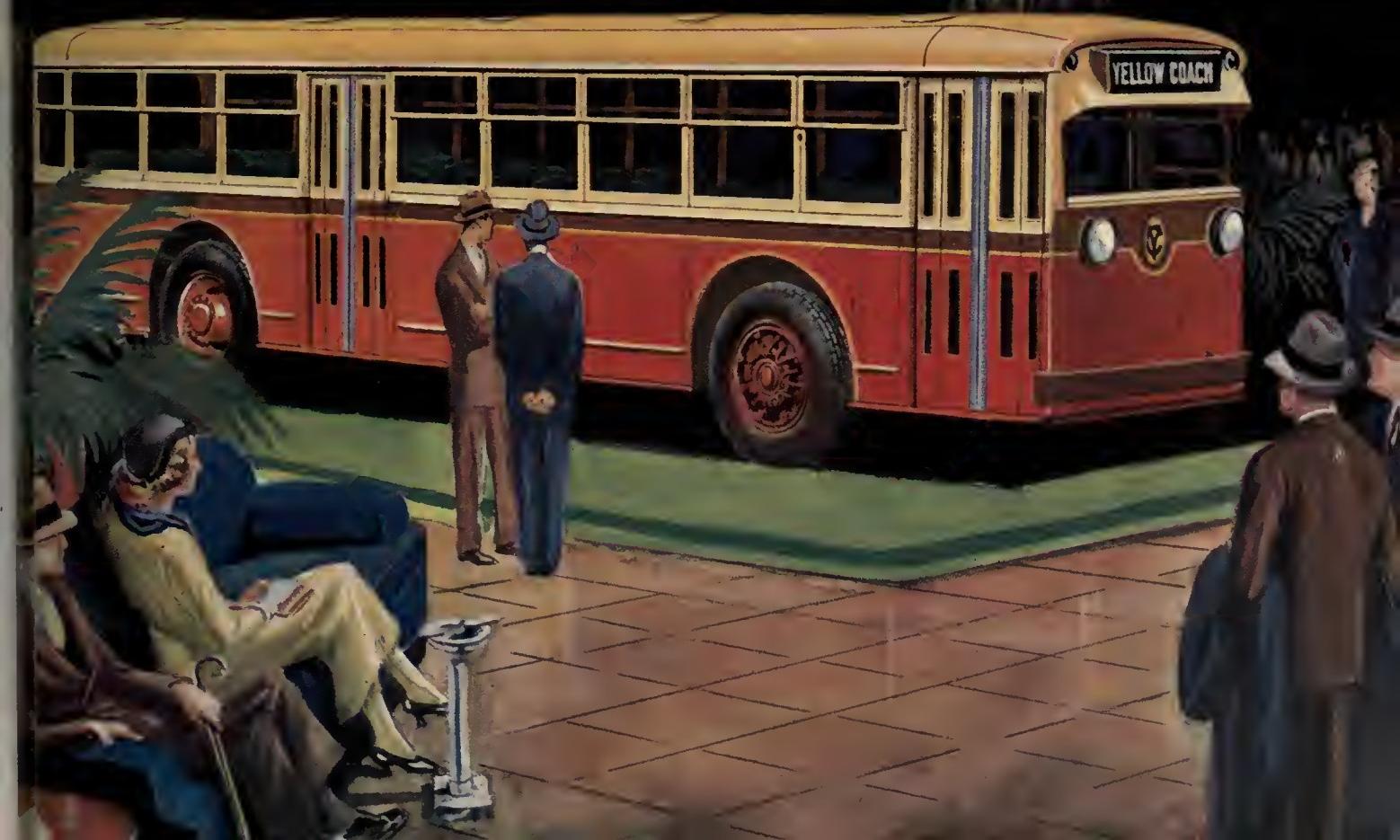
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Contents of the ANNUAL REPORT NUMBER

<i>Editorial—Confidence Strengthened by Progress Shown at A.E.R.A. Convention</i>	559
<i>Newly Elected Presidents of the American and Affiliated Associations</i>	561
<i>Fifty Years of Service and Readjustment</i>	562
By J. H. HANNA	
<i>Broad Aspects of Transportation Discussed by American Association</i>	563
<i>Improving the Street Car</i>	565
By C. F. HIRSHFELD	
<i>Economic Considerations in the Selection of the Vehicle</i>	566
By JAMES W. WELSH	
<i>Public Relations of Transportation</i>	567
By FRANCIS X. BUSCH	
<i>Determining Relation Between Price and Patronage</i>	568
By LESLIE VICKERS	
<i>Keeping Open the Arteries of Trade and Commerce</i>	569
By MERLE THORPE	
<i>Control of Economic Factors in Operation</i>	570
By JOE R. ONO	
<i>Costs and Competition in Street Use</i>	571
By E. J. MCILRAITH	
<i>Vice-Presidents and General Officers A.E.R.A.</i>	572

OCTOBER, 1931
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<i>Progress in Meeting Major Problems Outlined at Advisory Council Session</i>	573
<i>American Committees Had Active Year</i>	575
<i>Old and New Executive Committees Hold Convention Meetings</i>	577
<i>Coffin Award Won by Milwaukee</i>	578
<i>Luncheon Conferences Cover Many Important Subjects</i>	583
<i>Brady Awards Won by Boston Elevated and Calgary Municipal</i>	586
<i>Research Is Theme of Engineering Sessions</i>	587
<i>A Typical Urban Track Construction</i>	589
By E. P. GOUCHER	
<i>Experience in Trolley Bus Operation</i>	590
By W. C. WHEELER	

<i>Bus Materials Present New Problems to Storekeeper</i>	590
By W. E. SCOTT	
<i>Diesel Engines in Transportation</i>	591
By MARTIN SCHREIBER	
<i>Engineering Committees Show Results of Research Work</i>	592
<i>Fake Accidents and Legal Problems Considered by Claims Men</i>	595
<i>The Inter-Relation of Claim and Legal Departments</i>	596
By R. H. NESBITT	
<i>Accountants Study Apportionment of Costs</i>	597
<i>Cost of Collecting Fares</i>	598
By C. W. STOCKS	
<i>Determining Route Costs</i>	598
By I. O. MALL	
<i>Accountants' Committees Make Valuable Reports</i>	599
<i>T. & T. Association Studies Results of Committee Work</i>	600
<i>Bus Men Discuss Legislation and Sales Promotion</i>	603
<i>Co-ordinated Transportation Features Golden Anniversary Exhibit</i>	604
<i>Trend of Revenues and Expenses</i>	609
<i>News of the Industry</i>	611

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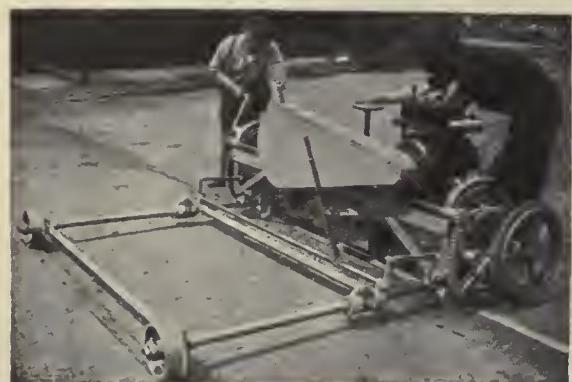
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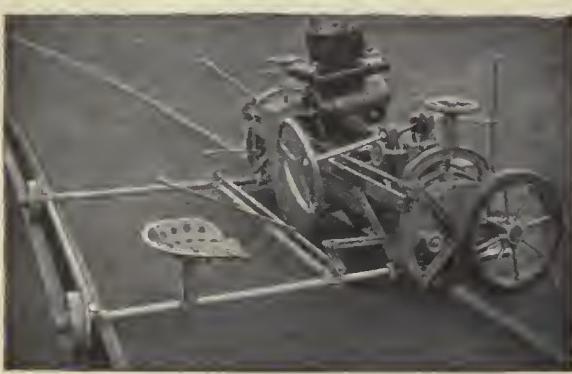
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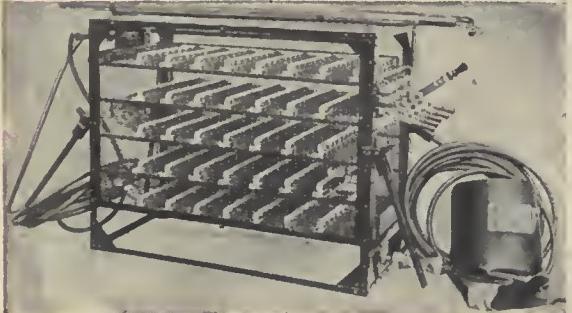
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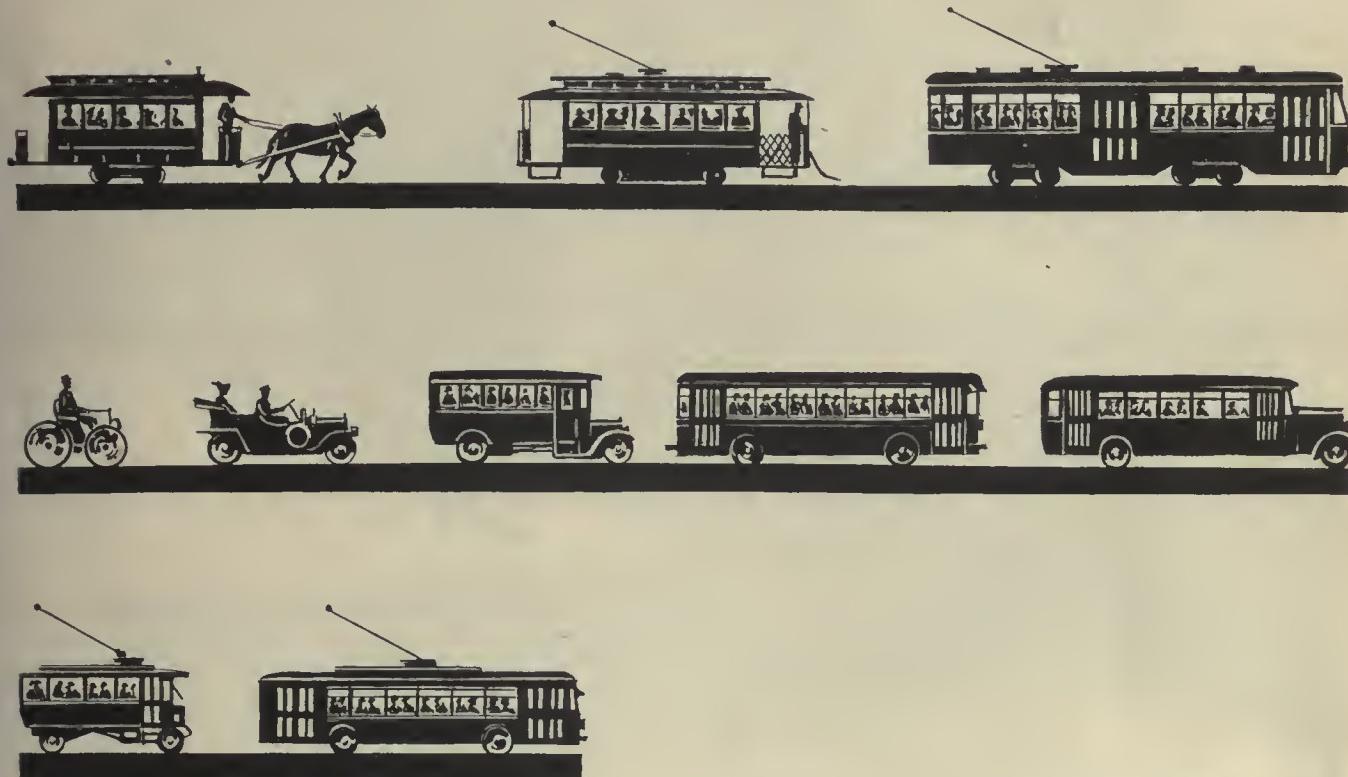
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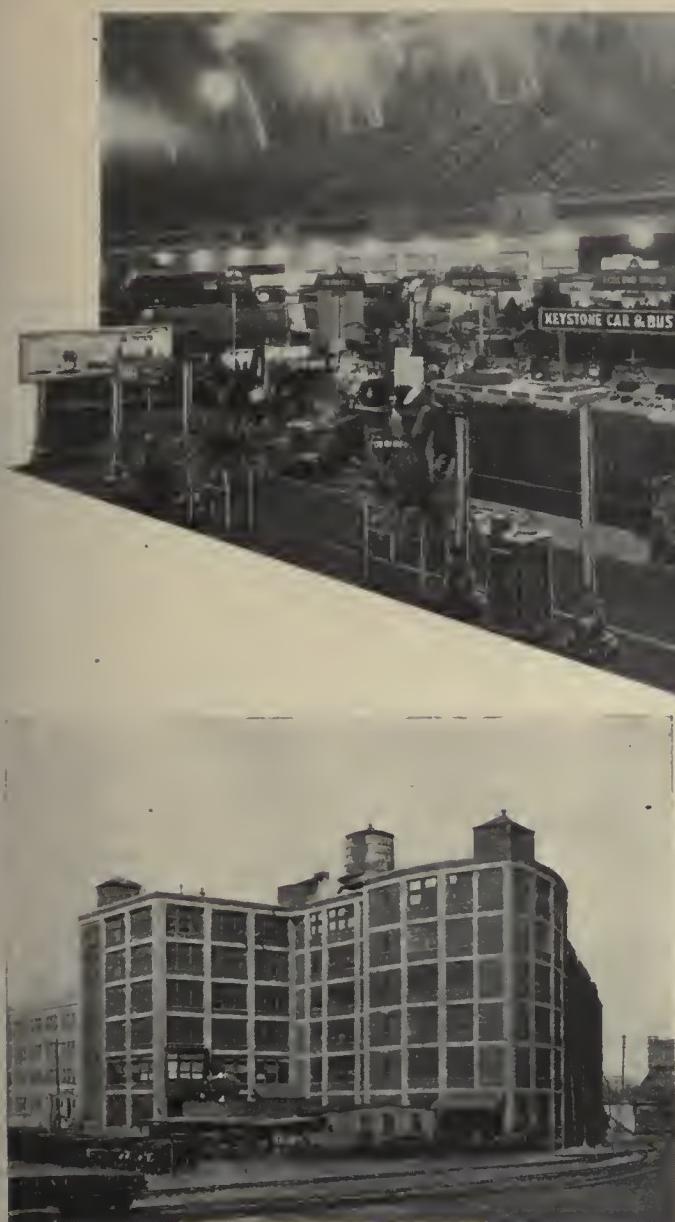
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*at Atlantic City
Convention, 1931*

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ELECTRIC RAILWAY JOURNAL

New York,
October, 1931

Consolidation of
Street Railway Journal and Electric Railway Review
Established 1884—McGraw-Hill Publishing Company, Inc.

JOHN A. MILLER, Editor

Volume 75
Number 11

Confidence Strengthened by Progress Shown at A.E.R.A. Convention

SUCCESSFUL and encouraging in every respect, the 50th annual convention of the American Electric Railway Association held at Atlantic City last week was an outstanding illustration of the ability of the local transportation industry to maintain its record of progress despite all obstacles. Both the attendance and the size of the exhibit were remarkably large for a year of severe business depression. Altogether more than 4,000 persons attended the convention. While this was somewhat less than the attendance at the A.E.R.A. convention in Atlantic City two years ago, the proportion of operators was larger than usual, the decrease being mostly among the ladies and guests. This excellent showing demonstrates again the high valuation which the industry places on the annual meeting. Some 80,000 sq.ft. of exhibit space was sold, approximately four-fifths of that sold at the convention two years ago. A particularly interesting feature of the exhibit was the display of transportation vehicles on the Boardwalk. This included the latest type of interurban car, a large and a small city car, a large and a small trolley bus, motor buses of various sizes and a taxicab. All were painted a uniform color and decorated with the symbol of the association to emphasize the idea of co-ordinated transportation.

Competition of Private Vehicles Slackening

EVERYWHERE a spirit of confidence was in the air. Many indications could be seen of the growing recognition of the importance of public transportation. This was emphasized particularly by the remarks of several speakers from outside the industry, as well as by the reports of various committees of the association. That a substantial volume of traffic has been lost by the public carriers to the private automobiles is well known. There is reason to believe, however, that this

trend has about reached its apex. Automobile registrations are not increasing at their former rapid rate. Financial as well as physical limitations are bringing to a close the era of providing more and more roadway space in urban areas for the use of private vehicles. The existing roadways are already overcrowded in most cities and it is becoming more clearly evident every day that adequate public transportation facilities are absolutely indispensable.

All of the operating companies have suffered as a result of the general business and industrial depression. Some report a slight trend back toward public transportation on the part of people who are finding private transportation too expensive under existing conditions. This gain in patronage, however, has been small as compared with the losses due to widespread unemployment. Nevertheless the operating companies have been able in a considerable measure to balance their budgets by curtailing expenses in proportion to the decrease in revenue. How this has been done was the subject of lively discussion at several of the luncheon conferences.

Equipment Modernization Attracts Attention

PROGRESS in modernization of rail equipment aroused keen interest among the delegates. The presentation of a report of the work being done by the Electric Railway Presidents' Conference Committee drew a large crowd to the meeting hall. While no attempt was made to go into detail concerning the research being conducted under the auspices of this body, the summary presented by its chief engineer gave the audience a much clearer understanding than they had before of what is being done. Then, too, the display of transportation vehicles on the Boardwalk under the auspices of the Manufacturers' Advisory Committee showed that much progress in design already has been

made. Great interest was shown in this display as well as in the new equipment exhibited in the Auditorium. The improvement in products indicates that the manufacturers are spending money on development even in the face of curtailed buying.

Closely akin to the interest in rail-car development was that displayed in the trolley bus. Representatives of companies which operate trolley buses were subjected to close questioning by other transportation men who are considering the use of this vehicle on their own properties. It was brought out clearly that under certain conditions the trolley bus possesses numerous advantages. At the same time the comment on this subject indicated a general recognition that this new vehicle is not a universal remedy for all transportation troubles, but should be adopted and used only where conditions are suitable.

As in previous years, the railway men were much interested in motor bus developments. Many new designs were shown. Those that appeared to attract the greatest amount of attention were the large types for heavy-duty and the small-capacity types for light traffic. Discussion of motor bus design, operation and maintenance took place both at the regular sessions and at the luncheon conferences.

Need for Better Fare Structure Recognized

INTEREST in the subject of fares was no less keen than that shown in the new equipment. A conviction has been growing in the minds of transportation men for several years that the industry knows too little about fares and the way the public reacts to changes in rates. This matter has been under intensive investigation by a special committee of the American Association for the purpose of "determining the relation between price and patronage." No simple and easy solution of the problem has been found nor is such a solution likely. Certain conclusions have been reached, however, with which there is likely to be general agreement. It is now widely recognized that the old flat rate for anybody riding any distance at any period of the day is no longer satisfactory. Experiments are being made to develop a fare structure on the principle that the occasional rider should pay the maximum rate, the regular every-day rider should have a reduced rate, and that some sort of attractive special rate should be offered to stimulate riding in the off-peak hours.

Coffin Award Won by Milwaukee Company

PRESENTATION of the Charles A. Coffin Award was, as always, a notable feature of the convention. This year the prize was won by the Milwaukee Electric Railway & Light Company for its record of "continuity in progress," despite the adverse influences of general economic conditions. This company's achievement in so adjusting its rates that both riding and revenue have been increased, in reducing operating expenses without sacrificing efficiency, in improving its safety record

and in building better public and employee relationships were recognized as outstanding contributions to the industry during the year. The recent accomplishments at Milwaukee have been of a high order and should give real encouragement to the efforts of other managements to overcome the obstacles of a similar nature which they themselves are facing.

Committee Work Prominent on Program

WHILE the arrangement of the convention program this year resembled that of previous years in most respects, certain worth-while improvements were made. Presentation of reports of certain committees of the affiliated associations at the sessions of the American Association tended to draw a larger number of delegates to the general meetings and to secure wider attention for the excellent work these committees are doing. Discussion of topics of broad interest at the meetings of the affiliated associations encouraged the attendance of a considerable number of the higher executives.

Some criticism was voiced, however, because of the overcrowded condition of the program. Since the general sessions of the American Association lasted longer than was expected and planned, the schedule for the rest of the day was somewhat deranged. Most of the luncheon conferences were late in beginning and even later in closing. This in turn delayed the start of the afternoon sessions, so that it was difficult to complete the day's business in the time available.

Improvements Developed Will Continue Effective in Better Times

SUMMARIZING the impressions of this year's convention, the local transportation industry is seen in a thoughtful and earnest frame of mind. But the attitude that is being taken is distinctly hopeful. The attention being concentrated on the most pressing problems—fares, equipment, schedules and traffic regulation—shows that the industry is not standing still. On the basis of actual experience, plans are being worked out that will improve conditions and methods. Many of the delegates reported beneficial results from such improvements as already have been put in effect—improvements that are more than methods dictated by mere expediency.

While general business conditions remain as unsettled as they have been recently, it is too much to expect a marked improvement in the situation of the transportation companies. But transportation men can and do expect better times, and they are now making plans through both management and methods that should redound greatly to the benefit of the industry, when the inevitable upturn from present subnormal conditions sets in. The close of the convention left both the operators and the manufacturers with a decided feeling of renewed confidence and faith in the future prospects of the industry.

Newly Elected Presidents

of the

AMERICAN and AFFILIATED

ASSOCIATIONS



G. A. Richardson
American Association

Guy A. Richardson, elected president of the American Association, is vice-president and general manager of the Chicago Surface Lines, one of the most exacting posts in the field of transportation the world over. He has had wide experience as an operator in city, suburban and interurban service, although in recent years his work has been largely with properties of the first magnitude rendering city service. In all its fields of endeavor, operating, mechanical personnel and public relations, the Chicago Surface Lines has been most successful. The association is assured in Mr. Richardson, as its president, of the same broad sympathy and understanding being brought to bear on its affairs that has characterized his previous work in its behalf as a committeeman and as an officer.

C. H. Jones, elected president of the Engineering Association, is general manager of the Chicago, South Shore & South Bend Railroad. He is an engineer turned executive. And his accomplishments as an executive are reflected in the excellent record made by his company in a field in which it has been unusually difficult to establish a record in the last decade. It was under his direction that the road was returned the winner in the Coffin prize contest in 1929. Mr. Jones would be the last man to lay claim to the accomplishments of that road, but it does remain a fact that he was one of the chief operating officials of the company under whom its activities were co-ordinated so successfully.

J. W. Giltner, elected president of the Claims Association, has recently been advanced from chief claim agent for the transportation companies centering at Akron, Ohio, to general claim agent of the Penn-OHIO Transportation System. His connection with the electric railway industry dates from 1907, when he joined the claim department of the Indiana Union Traction Company, Anderson, Ind. He has also served in railway claim work at Portland, Ore., and at Pittsburgh, and in accident insurance claim work. It has been said of Mr. Giltner in his own company that he has all the virtues of his predecessors and few of their faults.



J. E. Heberle
Accountants' Association



R. N. Graham
Transportation and Traffic Association

C. H. Jones
Engineering Association



J. W. Giltner
Claims Association

J. E. Heberle, elected president of the Accountants' Association, is assistant to the president of the Capitol Traction Company, Washington, D. C. Well schooled in commercial subjects, including accountancy, he became stenographer-clerk in 1908 to J. H. Hanna, who was then assistant chief engineer and is now its president. So well rounded has been his training that Mr. Heberle has turned his talents successfully to a myriad of problems. "Ask Heberle, he knows," has become a slogan in Washington. And his wide experience has been most helpful in the work of the Accountants' Association, the Engineering Association and the Transportation and Traffic Association. He advanced from chief clerk of the engineering department to chief clerk and statistician, to assistant secretary and finally to assistant to the president.

R. N. Graham, elected president of the Transportation and Traffic Association, is vice-president and general manager of the operating units of Transportation Securities Company, a subsidiary of the Commonwealth & Southern Corporation, operating at Youngstown and Akron, Ohio. Penn-OHIO, as the system is called, has been honored three times with highest national awards. It received the Coffin medal in 1926, and its largest operating unit, the Youngstown Municipal Railway, received the award again in 1930. The Brady safety medal went to Penn-OHIO in 1927. Mr. Graham is a lawyer turned executive.

Fifty Years of Service and Readjustment

By

J. H. HANNA

President American Electric Railway Association
President Capital Traction Company

THREE is no law in the broad scheme of life so changeless as the law of change. Civilized people demand progress in their methods of living. The local transportation business has lived up to the demand for change throughout its history of 100 years, and particularly since the founding of the association 50 years ago. The addresses at the first convention in Boston in December, 1882, exhibited a clear understanding of the street railway man's responsibility as a public servant and a wide grasp of the economic and social problems which local transportation must aid in solving. The need for change was clearly apparent to the speakers.

The five decades which have passed since that convention in Boston have been marked by five distinct phases in the history of local transportation. The first was that of experimentation. The industry was searching for the best tool. It was found in the electric railway system.

The '90's were the era of development and rapid growth. In two years, electric railway mileage had grown from 29 to 1,260. After ten years, electric railway mileage had increased fifteen-fold and constituted 95 per cent of the total. But the industry did not merely grow in size. The car and motor of 1900 were vastly different and much improved over those of ten years before.

The following decade was the era of prosperity and substantial but slackened growth; track mileage increased 82 per cent and the number of passengers carried and the value of road and equipment were approximately doubled. While operating revenues in this period increased 129 per cent, already the effect of longer hauls and single fares was appearing, and net income after operating expenses grew but 123 per cent. Engineering developments continued but consisted chiefly of refinements and improvements in designs already stabilized.

Having put its business on a sound foundation both financially and mechanically, the industry as a whole began to take stock of itself and brought about a complete reorganization of the association. Under the presidency and leadership of W. Caryl Ely in 1905

the present form of organization of a parent and affiliated associations was set up, permanent offices under a full-time secretary established in New York, and the interurban railways recognized by the change of name to the American Street and Interurban Railway Association. At the 1910 convention, the rather cumbersome name of the association was changed to that now used.

The fourth decade of our association's history must be marked as a period of changing conditions and, in many instances, serious financial difficulties. No longer could the business be classed as a monopoly. The vast number of automobiles brought personal transportation within the reach of millions of people who formerly depended upon mass carriers.

While undoubtedly much loss in revenue had already taken place due to automobile competition, the matter does not seem to have been seriously considered by electric railway men until about 1915, when the so-called "jitney" appeared and quickly spread over the whole country. The jitney was quickly followed by motor-driven buses. While the use of buses was at first contested by many street railway operators, the more farsighted soon realized that the bus offered a new but useful means of serving the public, and in a few years it was adopted by the industry as an additional means of rendering service. Again, the electric railway men, like their predecessors, recognized the law of change and showed their willingness and desire to furnish the public with any form of transportation which might best suit its needs.

The last ten years of our association's history has been a period of readjustment and rehabilitation. Many changes have taken place. For the first time electric railway men began to realize the necessity for merchandising their service. The association's activities were largely revolutionized, and thorough scientific investigation of all phases of the industry have been undertaken. The outstanding achievement of the association during this period was the formation of the Advisory Council by John N. Shannahan, while he was president of the association, in December, 1924. The establishment of the

Council and the appointment of a managing director greatly expanded the nature of the service which the association rendered.

The law of change still goes on. This great industry is no longer merely the electric railway industry, but is the agency which must be ready to furnish mass transportation to the inhabitants of our cities by rail, by electric or gasoline bus, or by any other means which is now or may eventually be available.

The Presidents' Conference Committee, by means of a scientific investigation such as never has been attempted before, is developing the ideal street car which will give a new kind of service, which the people demand, at a lower cost. A similar investigation is underway through association activities to determine what nature of fare structure will best suit present-day conditions. Many other important problems, such as employee relations, traffic congestion, and taxation, are receiving the same thorough consideration by association committees.

It can be stated without question that the service which we render is a necessity and that mass transportation is an essential industry. Recognizing this fact and also recognizing that existing conditions are entirely unsatisfactory from every viewpoint, it becomes the responsibility of the owners and operators of the companies now furnishing transportation service to show the way out of the wilderness.

Some of the requirements for improvement are:

From the companies—first, better and more economical cars, furnishing a faster and speedier service than that now generally offered; second, a well-balanced financial structure with obligations not in excess of physical assets; third, a fare structure which will more nearly distribute the cost of the service in proportion to the benefits rendered and which will attract the profitable non-rush and short-haul rider.

From the public—and its help must be obtained through the activities of the companies themselves—first, a definitely fixed franchise or operating agreement which shall assure such stability to the undertaking that new capital will be available; second, sympathetic regulation which, while thoroughly protecting the interests of the public, will allow freedom to management, and give co-operation with them wherever possible; third, relief from all special taxation and in some instances, no doubt, definite financial help.

If the co-operation of the business men, of regulatory bodies, of the press, and of the public generally, is obtained, this great industry will pull itself out of its present difficulties and live up to the long line of successful achievements in serving the public, which have marked its history for the 50 years just behind it.

Broad Aspects of Transportation

Discussed by American Association

KEEN interest in a variety of broad problems now facing the local transportation industry was shown by the large number of delegates attending the general sessions of the American Association. The activities of this association commenced with a general session on Monday morning in the auditorium ballroom. President J. H. Hanna called the meeting to order and introduced Joseph B. Perskie, city solicitor of Atlantic City, N. J., who spoke a word of welcome to the convention and delegates, to which Mr. Hanna responded on behalf of the association. The president then gave a historical review of the industry's service and readjustment during the past 50 years, concluding with a number of recommendations for the industry's development in the future. He called attention particularly to the need of further studies on franchises, fare structures, engineering research, modernization and merchandising methods. An abstract of Mr. Hanna's address will be found elsewhere in this issue.

Joseph P. Day, prominent in real estate activities in New York City, discussed the relationship between transportation and urban property values. "Public transportation," he said, "is the key to real estate values in every city from New York to San Francisco. Our most successful real estate operators do not wait until rapid transit facilities* are completed before making their land investments. They buy strategic locations in outlying sections knowing that when public transportation catches up with population growth, the value of their investment will have multiplied many times over." Mr. Day discussed traffic problems and told the part transportation has played in aiding in the decentralization of our larger cities.

Merle Thorpe, editor *Nation's Business*, Washington, D. C., prefaced an address, on "Keeping Open the Arteries of Trade and Commerce," by interpreting the factors which are influencing present economic conditions. He recommended a revision of individual and collective mental attitudes, aggressive salesmanship and a decrease in the hope of relief by government. Mr. Thorpe urged that the energy of the American Electric Railway Association be devoted to the education of public opinion. "Car riders, industries and business firms view with an unsympathetic eye the problems of this great industry," he said. "The street railway invest-



J. H. Hanna
President

ments are in an unstable condition. Great difficulty is experienced in obtaining new capital, and a large proportion of the few improvements that have been possible during the last few years has been financed out of earnings or through unsecured loans provided by stockholders. They forget that, despite the enormous increase of automobile ownership, the street railway still carries 75 per cent of all the people transported within large cities. They forget there is invested approximately \$5,500,000,000 in the securities of these companies. They forget the industry ranks eighth in the amount of invested capital in the United States. They give time, thought and attention to the difficulties of the textile industry, the coal industry, the oil industry, but they take your industry for granted.

"If the public would regard your problems with a purely selfish interest, would realize that it is a national industry and not local; if it would approach local problems with this broader outlook, such an outlook would greatly benefit the public. It is not alone the preservation of a \$5,000,000,000 investment. The problem is much more far-reaching than that, because as the investment is impaired, billions of dollars of real estate and business will be affected. The hope lies in a better understanding of the complexities of

city transportation on the part of the public and the public's officials." Mr. Thorpe's address is abstracted more fully elsewhere with this issue.

The report of the Committee on National Relations was presented by C. D. Cass, general counsel A.E.R.A. Mr. Cass described the activities of the Washington, D. C., office during the past year, and the present status of legislation which is of interest to the transportation industry. An abstract of the report appears elsewhere in this issue. He particularly called attention to the order recently handed down by the Interstate Commerce Commission in the matter of depreciation for steam railroads and telephone companies. This decision prescribes the classes of property for which depreciation charges may properly be included under operating expenses, and the percentages of depreciation which shall be charged with respect to each of such classes of property; and prohibits the carriers from charging to operating expenses any depreciation charges other than those prescribed. All carriers subject to the jurisdiction of the Interstate Commerce Commission may eventually be subject to this requirement of law, Mr. Cass said, and the recent order of the commission affecting the telephone companies and the steam railroad companies is the first normal step in the application of the statute to all carriers under the commission's jurisdiction. Mr. Cass believes that the final attitude of the Interstate Commerce Commission in this matter will no doubt be adopted and utilized as a standard by various State commissions in dealing with the purely intrastate electric railways and other public utilities within their respective States. He looks for a final standardization, nation-wide in extent, affecting all utilities subject to commission regulations in the matter of depreciation and depreciation accounting.

Mr. Cass pointed out that the purely intrastate carriers not now subject to the jurisdiction of the Interstate Commerce Commission are vitally interested in the subject matter of depreciation, as well as are the electric railways engaged in interstate commerce, and reporting to the commission. "I call this to your attention," said Mr. Cass, "because I think that there must be some very careful, painstaking, serious thinking in regard to this subject, not only by those who will be directly and immediately affected by an order of the Interstate Commerce Commission issued

in respect of depreciation and depreciation accounting for electric railways, but also by the intrastate and purely urban carriers who consider themselves remote from the jurisdiction of the Interstate Commerce Commission, and who have been happy and contented that they were so."

The second session of the American Association, held on Wednesday morning, opened with a report of the Committee on Revision of Constitution and Bylaws. G. A. Richardson, vice-president and general manager Chicago Surface Lines, presented this report, an abstract of which is given elsewhere. Following Mr. Richardson's report, a resolution was presented by J. N. Shannahan, chairman the Advisory Council, for the appointment of a special committee to assist in the preparation of a brief on the subject of mass transportation, to be presented in behalf of the association to the United States Chamber of Commerce. The Chamber issued an invitation to the association to co-operate in this matter, and assist it in its general study of transportation throughout the country. Mr. Shannahan's resolution was unanimously adopted.

Francis X. Busch, formerly attorney for the city of Chicago, addressed this session on the subject of public relations of transportation. He dealt principally with conditions in Chicago, and emphasized the value of rendering a constantly improved service as the greatest factor in any public relations program. He paid a compliment to the present Chicago transportation management and their application of this principle, and told how it was reflected in the public approval of the new co-ordinated transportation scheme for that city. Mr. Busch's address is abstracted on a following page.

Dr. Thomas Conway, Jr., president Cincinnati & Lake Erie Railroad, and chairman of the Electric Railway Presidents' Conference, opened a discussion on the activities of that body by summarizing its organization and present status. He told, in a general way, of its activities for the past year, of the work it is doing in its field laboratory in Brooklyn, and its general program for future work. He then introduced C. F. Hirshfeld, chief engineer of the conference, who addressed the meeting on the subject of "Progress Toward Improving the Street Car." Mr. Hirshfeld described the work which is in progress in Brooklyn and the organization of the personnel doing this work. His report is abstracted on another page. His address was accompanied by a motion picture film which showed the use of several precision instruments developed for the measurement of distortion of car bodies under various loads. The film also showed the construction and application of a trailer equipped with a photo-

electric device for measuring voltage, main current, acceleration, distance and time elapsed. It illustrated studies being made of the effect of acceleration on passengers, the reduction of noise, illumination, ventilation and the action of various members of a car in motion.

The third general meeting of the American Association was held on Thursday morning. Charles Gordon, managing director A.E.R.A., was the first speaker. He summarized his activities as managing director during the past two years and described the functioning of the association's personnel. His address dealt particularly, however, with a review of the convention's accomplishments, and referred to the valuable reports submitted by the committees of the various associations during the year.

Joe R. Ong, chairman Committee on Operating Economics (Transportation and Traffic Association), spoke on the control of economic factors in operation. Discussing the economics of electric railway operation, Mr. Ong said: "During the War, when the necessity for co-ordinated effort between different armies was paramount, it was found necessary to have liaison officers. There was some such thought in the minds of those suggesting the needs for a committee on operating economics. This committee, while not intending to encroach upon the subject normally within the scope of other affiliated associations, must of necessity touch upon many items that may appear to overlap in order to co-ordinate the subjects properly.

Mr. Ong discussed the necessity for increased speed, the rider's demand for modern design and comfort in equipment and the securing of fare structures which will increase revenue. He listed examples of traffic-stimulating programs carried on by many companies. His address is published in greater detail on a following page.

James W. Welsh, chairman Committee on Economics of Rolling Stock Application (Engineering Association), discussed the economic considerations in the selection of a vehicle. Mr. Welsh described his message as a guide to the selection of the best forms of transportation to meet the diverse conditions existing on various properties. Mr. Welsh's discussion on vehicle analysis and the determination of costs appears elsewhere in this issue.

E. J. McIlraith reported for the Committee on Street Traffic Economics, and Leslie Vickers, economist A.E.R.A., reported for the Committee on Fare Structures. Abstracts of these reports will be found elsewhere.

Awards for the Anthony M. Brady safety contest and the *Electric Traction* speed contest were made at this session. In the absence of Arthur Williams, president American Museum

of Safety, Guy C. Hecker, general secretary, A.E.R.A., made the Brady awards. Edward Dana, manager of the Boston Elevated Railway, received the medal and certificate for the winner in the large-city class. John Ross, chief engineer, Department of Street Railways, Detroit, accepted the certificate of honorable mention in the large-city class. In behalf of the Calgary Municipal Railway, K. B. Thornton, president of the Canadian Electric Railway Association, accepted the medal for the winner in the small-city class. R. N. Graham, vice-president and general manager Youngstown Municipal Railway, received the certificates of honorable mention for his company in this class. No award was made in the interurban class. A separate article in this issue deals with the Brady contest.

T. Fitzgerald, chairman of the Speed Contest Committee and vice-president of the Pittsburgh Railways, awarded the silver cup to the Chicago, North Shore & Milwaukee Railroad. S. A. Morrison, assistant general manager accepted for the company. Honorable mention was given to the accomplishments of the Cincinnati & Lake Erie Railroad; the Chicago, Aurora & Elgin Railroad, and the Milwaukee Electric Railway & Light Company.

A report of the Committee on Resolutions was made by D. W. Pontius, president Pacific Electric Railway. The following officers elected during the Wednesday morning session were installed for the ensuing year.

President—G. A. Richardson, vice-president and general manager Chicago Surface Lines.

First Vice-President—J. H. Alexander, president Cleveland Railway.

Second Vice-President—Walter A. Draper, president Cincinnati Street Railway.

Third Vice-President—W. E. Wood, vice-president Engineers Public Service Company, New York City.

Treasurer—Barron Collier, president Barron G. Collier, Inc., New York City.

For operating members at large of the Executive Committee for the three-year term expiring 1934:

A. B. Patterson, president New Orleans Public Service, Inc.

Robert M. Feustel, president Indiana Service Corporation, Fort Wayne, Ind.

For manufacturer members at large of the Executive Committee for the three-year term expiring 1934:

M. B. Lambert, assistant to vice-president Westinghouse Electric & Manufacturing Company, New York.

H. E. Listman, vice-president General Motors Truck Company, Pontiac, Mich.

John B. Timmon, sales manager Metal & Thermite Corporation, New York City.

For operating member at large of the Executive Committee for a one-year term:

A. M. Hill, president Charleston Interurban Railroad.

Improving the Street Car

By

C. F. HIRSHFELD

Chief Engineer
Electric Railway Presidents' Conference Committee

EVERYBODY knows that the street railway industry is sick. You know it, the banker knows it, the public knows it. The symptoms of the disease are very evident. Income is not sufficient to balance all proper costs and yield a reasonable profit. Thus far all agree. But when it comes to diagnosing the case, when it comes to accounting for the symptoms displayed by the patient, the doctors disagree.

It must be admitted that the patient is already an elderly gentleman. He has not always been in the most perfect health, but until recently the troubles were confined to isolated spots. Now the patient seems to be suffering from some sort of general complication of troubles which is rapidly sapping his vitality.

There is one group of doctors who quite cold bloodedly maintain that the dear old gentleman has served his useful life and is now ready for the industrial scrapheap. Those who have thus given up the patient seem to comprise on the one hand learned and able men who do not have much time to devote to this rather unpromising and not overly remunerative patient, and on the other hand rather young practitioners who are inclined to jump at conclusions without giving adequate study to the subject and his symptoms.

Another group believes that although the patient is suffering from a serious ailment, he is still a very necessary member of the community and that he can be cured by proper treatment. Unfortunately the doctors in this group differ among themselves as to just what is the basic trouble and what curative remedies should be used. Thus there are some that insist that the old gentleman's diet is entirely wrong; that he change his diet, that is adopt a different fare system. There are others who claim that he is simply dissipating his strength and nervous energy by attempting to cover too wide a field of activity. They advocate that he concentrate on the heavier tasks and permit younger and more agile individuals to handle the lighter ones. Another group insists that the clothing which the patient wears in public is all wrong, reflects the customs of a bygone generation, affects his health by giving him an inferiority complex, and places an unnecessary and very heavy load upon his remaining energies. Some would have him wear light-weight and bright-



C. F. Hirshfeld

colored clothes in place of the heavy and somber raiment of which he is so fond. Others would have him merely adopt rubber heels. And so on through a long list.

When doctors disagree the patient suffers, and he has done so in this case. However, there is still hope, because a far-sighted group, after studying this patient and his activities, has concluded that he is not incurably ill, that he still performs a very useful function in the community, that he can be put into condition to become self-supporting, and that he will be saved if it is in their power to save him. They are wise men and have determined to consider all means of influencing his health, not to confine themselves to one or another pet hobby. They have therefore divided themselves up into commissions of committees, and each of these units is busily studying what has been assigned it. One has taken the condition of the patient's blood stream, another the way in which he orders his daily life, another his diet, another his clothing, and so on. They believe that, if they can assemble all the facts about this patient, he himself will have sufficient intelligence and ability to cure himself under proper medical guidance.

It is my privilege to outline the plans and activities of one of these committees, specifically the one which is studying the old gentleman's clothing in which he appears in public, and by which the public judges him. This committee suspects that his present antiquated garb not only places an unnecessary drain upon the patient's energies, but that it also causes the general public, and particularly the younger part thereof, to class him as an antique and

to pass him by, either in mirth or in pity. This particular group is called the Electric Railway Presidents' Conference Committee.

The job is to find out what is wrong with the present-day street car, to discover what is now required of a street car, and then to guide the genius and producing capacity of the industry in the design and construction of a rail vehicle suited to modern urban needs.

There are two ways of undertaking such a commission. One is the inspirational method; the other, the fact-finding or research method. We might have adopted the first and have produced within a few months a car design as different from the conventional vehicle as fertile imaginations could devise. The result would have been spectacular and the immediate cost would have been low. But the value of the product would almost certainly have been small, its chief claim to distinction would have been its novelty.

We chose instead the slower and less spectacular, but much more certain, fact-finding method. This is the method that industry has recently adopted from the scientists and which has proved so effective in improving industrial processes and products. It depends quite simply on the determination of all significant relevant facts, so that final action can be based upon real factual knowledge instead of upon more or less arbitrary decision between conflicting opinions, traditions and rules of thumb. It is our belief that if we determine and publish the necessary facts, the brains and genius already in the industry will prove competent to take advantage thereof in the production of new designs.

The fact-finding method is not necessarily experimental. In this case it involves complicated analytical work and the compilation of statistical information, in addition to test and experiment. The test program constitutes, however, the largest part of our fact finding. It includes among other things the accurate determination of the characteristics of present available cars and equipment. For this purpose we have set up a field laboratory on the property of Brooklyn & Queens Transit Corporation.

We must use the modern car as a point of departure. We want to know just how strong it is in different respects and whether any of the component parts are stronger than they need be or weaker than they should be. The car body is treated as a box girder and subjected to loads which simulate those experienced in use.

But we must not confine our attention only to the car body. The trucks represent a large part of the weight and of the cost, and they are of outstanding importance with respect to performance. Therefore we are studying the truck experimentally just as we are studying the car body.

Another thing that we want to know is how a modern car starts and comes up to speed—that is, we need the time, distance and force relations. We are using an entirely new method for this purpose and it is giving us very exact data.

Ultimately we hope to produce a car which will start and stop as readily as possible. But what do we mean by this? Among other things, we mean as rapidly as the passengers can tolerate. No one knows just what passengers can tolerate and therefore we have in progress at the University of Michigan experiments to determine the facts.

Our investigations indicate that noise reduction is one of the most necessary improvements. In fact, complete elimination is the ideal to be approached as nearly as possible. If we are to approach such an ideal it is not sufficient to measure only the volume of noise. We must break the total volume down into a noise spectrum, determine the frequencies which are responsible for the greatest volumes, and then run these frequencies down to their sources.

During recent years the illumination of street cars has been given much

thought. We are measuring the intensity of illumination in different typical modern cars, and we are also obtaining data from which the expectable characteristics can be determined in advance with greater precision than is now possible.

Discussion with car riders has brought out the fact that better ventilation is highly desirable. Therefore, much work is being done on this subject. The ventilation of the car is studied by creating in the car a uniform mixture of carbon dioxide and air within it, and then determining the rate at which the carbon dioxide disappears under different operating conditions.

We realize fully that both funds and time are limited; we realize that our major task is the production and proof of a greatly improved car; we realize only too well the imperative need of haste. Of necessity, our first efforts must be experimental, that is, fact finding in character. Similarly, our first bulletins must deal with methods and later ones with determined facts. But, the entire program is planned with a view to reaching practical, usable results as quickly as possible.

stance, rather than to be so allocated on some arbitrary basis of apportionment. Such a method of fact finding is equally applicable to any form of transportation, whether composed of rapid transit, surface rail route, or trolley and gas bus operations.

This study will permit the actual cost of service, including all investment charges as well as all other expenditures, to be determined for each route. Comparing its cost thus obtained with its revenue discloses its profitability or the reverse. The effect of such an analysis is to bring out in sharp relief the gains and losses on the system. There will be found far greater variation in the earning power of routes on the same system, than between any two systems in the country. If fares were fixed by the costs of service, route by route, almost any system would have some favored line with short-haul and dense traffic where the fare might be cut to a cent or two. Other lines would require rates as high as 25 or 50 cents. Such a fare plan would, however, soon be self-destructive, as it would be impossible to secure sufficient traffic on the lean routes in order to make them earn a reasonable return at any fare.

A striking result of the varying costs on routes is shown in the example of a system of 30 routes. The analysis discloses that only half of the routes have a cost per passenger equal to the average system fare of 8 cents. On the remaining routes, the fares would range from 7 cents to 19 cents.

When you reflect that the margin between costs and revenues is usually close, it is evident that attention paid to these losing routes might readily balance the budget without disturbing the fare on the whole system. It is not suggested that fares should actually be varied in accordance with the route costs, but when such losses are thus revealed, the desirability of considering other types of vehicles in such cases is very positively indicated.

In comparing the economic value of bus and rail car, each has one outstanding claim for superiority which the other lacks. For the rail car, its unquestioned advantage to date is its high peak-load capacity with all that entails in lowering rush-hour costs. For the bus, the absence of track investment is its high point of pre-eminence. On the investment side of the equation we find the average capital devoted to street car operation is five times its annual revenue; while with the bus the investment and annual revenue are equal; hence for the same revenue (assuming this represents equivalent capacity) the bus demands but one-fifth the capital investment of the rail car. On the basis of a 6 per cent return on the investment in each case, the bus could reach a 94 per cent operating ratio, while the electric rail car must hold its ratio down to 70 per cent.

Economic Considerations in the Selection of the Vehicle

Based on the report of the
Committee on Economics of Rolling Stock Application

By

JAMES W. WELSH

Consulting Engineer, New York, N. Y.

FOR years the medical profession sought the remedy for the ills of humanity in cure-alls, tonics, medicines which toned up or stimulated the heart and body as a whole. It was not until Pasteur in 1876 discovered that specific bacteria were the immediate causes of special diseases that any effective progress was made in combating bodily ailments. Is not this the lesson for our industry? We must isolate the troubles, break down the problem into its simplest elements before attempting a solution.

The Committee on Economics of Rolling Stock Application believes the route or line is the starting point for such a study. Each route of the system should be segregated and set up independently for the purposes of analysis as though it were a separate company. It should have its own valuation of property devoted to transportation service and a



James W. Welsh

separate road and equipment account. After this, as far as possible, all operating and maintenance should be directly charged to the route in the first in-

Too often this whole problem is looked upon as a mere refinement and as of little practical importance when a company is harassed by many difficulties. On the contrary, what question can be of greater importance than the selection of the very mode of transportation itself; or, still more vital, whether to continue operation at all. Perhaps a part of the difficulty responsible for such a viewpoint is the unconscious assumption that any change from rail car operation presents too many diffi-

culties, both political and financial as well as economic.

Should we not think of this problem as our job to produce a unified transportation system for our communities? It would be a built-up organism composed of high-speed rapid transit lines, surface rail routes, trolley buses, gas buses, de luxe coaches and taxicabs. It would be a placing together of all forms of transportation, each the best of its kind for its place, all into one unified whole.

Public Relations of Transportation

By

FRANCIS X. BUSCH

Taylor, Miller, Busch & Boyden
Chicago, Ill.



Francis X. Busch

AN ARTICLE by Francis H. Sisson in the August issue of the *ELECTRIC RAILWAY JOURNAL* graphically presents a most anomalous situation in that branch of the public utility industry which he includes under the heading, "Operations of Electric Railways in Mass Passenger Transportation."

Quoting from the latest United States census of electric railways, he says that while the total number of passengers carried by electric railways increased nearly 300 per cent in the 25 years from 1902 to 1927, and while the number of car-miles operated and the amount of invested capital were doubled, the net return, after deducting operating expenses, including taxes and municipal impositions, declined from 5.3 per cent in 1902 to 3.1 per cent in 1927.

Despite the essential nature of passenger electric transportation—14,500,000 customers served yearly—a service without which the cities of our country could not exist—it is generally conceded by well-informed persons that the operation of passenger electric street railway transportation, even with the supervising regulation of rates by public utility commissions, does not offer a field of investment as attractive as that to be found in other utilities and in industry generally.

Mr. Sisson, after ascribing the almost uniform lack of satisfactory earnings by the country's mass transportation agencies to higher operating costs and increasing automotive competition, stresses the fact that one very important cause of the difficulties of electric railway companies has been the oppressive and arbitrary treatment they have so

often received at the hands of public officials.

Public support, through an adequate franchise and sympathetic understanding and co-operation of public officials, is indispensable to a successful management of a public transportation system. Prosperity for the industry cannot exist without this support and co-operation. In this connection Chicago furnishes, as the doctors would say, "some splendid clinical material."

In May of 1930 the City Council of Chicago passed, and the people at a referendum in July approved by a vote of more than five to one, an ordinance granting to a company which is to acquire all the existing surface and elevated railway properties, an indeterminate franchise upon terms which will permit the consolidation, refinancing and extension of the present properties, including subway construction to be financed wholly by the city through special assessments, the accumulated

traction fund, or general bonds. The ordinance further provides, not for a fixed and unchangeable rate of fare, but for the charging of a rate of fare to be determined by the lawfully constituted regulating authority, sufficient to produce a reasonable return on the capital invested. It is an ordinance which deals justly with the city and the utility and is in accordance with recognized sound economic principles.

Taken by itself, there is perhaps nothing particularly significant in this statement. However, when it is considered in the light of the fact that the preceding traction ordinances, passed in 1907, were twenty-year franchise grants definitely providing for and contemplating acquisition of the properties by the city for municipal ownership at the end of those grants, and when it is further considered that for more than 25 years—from 1897 to 1923—the public attitude towards Chicago traction managements had been one of suspicion, distrust, and unbroken hostility, there is indicated a reversal of public opinion so complete that a search for its cause should be profitable.

During the period from 1897 to 1907 it was declared on every hand that Chicago's traction system was controlled by a defiant and corrupt management, which furnished the most inadequate and inefficient transportation to be found in any large city in the United States. The hostility of public sentiment toward the traction companies was repeatedly reflected in political campaigns and municipal policies. Carter H. Harrison was elected Mayor in 1897 on an anti-traction franchise issue. He was re-elected on variations of that issue in 1899 and 1901 and 1903. A strong sentiment for municipal ownership and municipal operation developed during this period. In 1905 Judge Edward F. Dunne, an out-and-out advocate of municipal ownership and operation, was elected Mayor.

It was in this atmosphere that the 1907 street railway ordinances were prepared. Among other things, these grants provided for a division of the net receipts of the operation of the properties. The city was entitled to receive 55 per cent of all net annual receipts remaining after the payment of operating expenses and a fixed return of 5 per cent per annum upon the capital value of the traction properties. This was expected to create a fund with which the city might, either before or at the expiration of the grant, purchase the properties for municipal ownership and operation.

In the eight-year period following 1907 \$91,000,000 was spent for additions and betterments, which laid the solid foundation upon which was later built the finest electric surface railway system in the world. Prompt and faithful compliance by the companies (until

prevented in 1915 by World War conditions) with the provisions of the ordinances for building extensions and betterments undoubtedly mollified to some extent general public distrust of the railway managements, but sentiment on the whole continued antagonistic.

The 1907 ordinances were undoubtedly the best ordinances obtainable at the time of their passage. As the years passed, however, unforeseen changes developed, due to the widespread use of the automobile, the new competition in buses and transportation, and advancing costs due to the high price levels of the war and post-war periods.

By 1918 it was obvious alike to the city and companies' representatives, in view of Chicago's traction history, and with a franchise expiring in less than ten years, that the financial demands for necessary extensions and betterments of the street railway system could not be met. An attempt was made to agree upon a new franchise. In spite of practically unanimous newspaper support a proposed ordinance was defeated at a referendum, largely because of the expressed distrust of the then management of the properties.

Such was the state of affairs and such the state of public opinion when, in 1923, the active management of the Chicago Surface Lines (operating all of the electric surface railways in Chicago) was changed. The change developed an immediate improvement in scheduled service, instituted better supervision and therefore more dependable operation. As the public found less crowding, greater regularity, and less of a "devil-may-care" attitude on the part of the men, the citizens began to manifest a kindlier attitude toward the company.

Almost simultaneously with the change in company management came a change in city administration. Another effort was made to "settle the traction question." Another ordinance was drafted providing for the immediate vesting of title to all of the traction properties (surface and elevated) in the city. The city was to give in exchange for the properties certificates bearing 5 per cent interest, payable, as to principal and interest, out of the earnings of the properties. The city by the ordinance obligated itself to maintain a rate of fare sufficient to meet operating expenses and provide for the amortization of the certificates. The ordinance was overwhelmingly defeated. Political groups antagonistic to the administration feared that the fare would have to be largely increased to meet the obligations of the ordinance. Opposition of radical groups that it did not provide for more immediate municipal operation, and opposition from a growing element opposed to either municipal ownership or operation, combined to bring about its defeat.

In 1930 the company asked for per-

mission to install trolley bus service. The trolley bus showed such superior riding qualities and passenger convenience that the public officials were at once impressed with the progressive ideas of service and equipment shown by the company. The Chicago public now feels that it can look to its transportation company to keep fully modernized and give appropriate service as conditions develop.

A willingness on the part of the management of the companies to participate in programs of improvement; to co-operate with city officials in the settlement of problems where the knowledge or skill of its employees may prove valuable; to render continuously to its patrons, with a respectful group of contented employees, the best service of which its property is capable; to meet and discuss frankly and fairly, either before regulatory bodies or in the company's offices, the unjustified as well as the justified complaints of citizens or citizen associations—this conduct reversed the public sentiment of Chicago as it existed prior to 1923.

It is one thing merely to operate a transportation system. It is quite another thing to operate a transportation system so that the public that is served is satisfied and possessed of such confidence in the management that it is willing to extend its operating rights in the confident hope that it will receive even better service. Therein rests the job of management—to do its daily job well, to apprehend and meet extra demands put upon the service, and to interpret correctly the needs of the hour in transportation. There also is the key to satisfactory public relations. Direct relationship with the public occurs on one or two occasions during each day when your equipment and your operators carry one member of the public to or from his home. No other utility affords such intimate contact. It is this contact which forms individual opinion. It is the multiplication of these individual opinions which molds public opinion. It is an appreciation of this fact by the management of the electric railways in Chicago that has made this story possible.

Determining Relation Between PRICE and PATRONAGE

Based on the report of the
Committee on Fare Structures

By

LESLIE VICKERS

Economist
American Electric Railway Association



Leslie Vickers

THE one great problem in fares today is how to fill up the empty seats that most of our systems have in the off-peak hours. In other words, what we need is a fare that will improve the load factor. Cities may be

able to do something to help us by staggering the hours of work, etc., so that our peaks both morning and evening will be spread out over a longer period, but we must help ourselves in the matter of getting revenue out of the seat-miles which have to be operated if we are to maintain a public transportation system at all.

Because we know so little about matter connected with fares the Fare Structures Committee of the American Electric Railway Association was called into being. Its task is to try to formulate the principles which should govern the establishment of fares, and to do this it must study the history of fare changes in the past and, at the same time, conduct on its own account or encourage the conduct of such experiments throughout the country as will give it a basis of experience in the present day.

Undoubtedly the two main factors to

be considered in a discussion of fares are the cost of rendering the service to the company which performs it and the value of the service rendered to the person who buys it. We deal with masses, not individuals. We cannot say that this customer costs us so much and that customer costs us a certain other amount. It is difficult for us to tell how far they ride or to determine the limits of the groups which we call peak riders, for whom our cost of service is undoubtedly high. Unlike the gas and electric and other industries, we have no exact metering device, and the best that we could do if our fares were to be determined on the cost to us would be to set up arbitrary distinctions.

We know that it costs more to carry a passenger in the peak hours than in the off-peak hours. Then, too, we know that it does not cost us as much to transport a passenger in the reverse direction as it does in the direction of the main traffic flow. We are rapidly coming to the conclusion that the distance which a passenger rides is one of the least important elements in our costs in urban service. On the other hand, the length of line provided, together with the number of cars which must be in service on that line, is very important.

We must never lose sight of the fact that while the cost of the individual service may be of importance to us, of far more importance to the user is the value of that service and of the ease of substituting something else for it. If he won't patronize it at the price we charge, we may have to reduce the price as most sellers of commodities have to do. We must find the price that he will pay. We can no longer consider our customers as a group which put one single value on the service that we have to sell but as a mass divided up into a great number of groups who set different values upon it. If we cannot sell all of our goods on the main floor, let's put some of them down in the bargain basement and reduce the price to move them. Our service is a perishable service. Once the street car has moved along on its journey, the service which it had for sale on that trip can never again be offered. Those empty seats have been offered without takers. Our job is to find a fare structure which will sell a greater part of our service, popularize public transportation and provide us with funds to enable us to keep on improving the only thing we have to sell—namely, *service*.

There seems to be little dispute now that the casual rider or the one who patronizes the service just occasionally should pay the maximum rate. There seems to be agreement also that the wholesale rider should be recognized as such and a concession granted to him even though he is usually a patron at a time when it costs most to serve him. There is a growing conviction in the

industry that we must coax the public back to the use of our service at off-peak times by some kind of price concession, and while no one is in a position to present a formula universally applicable to bring this about, such experiments as those of Milwaukee, Boston, Gary and Cleveland, to mention only a few companies, have done much to show us the way to better merchandising.

While, generally speaking, it takes only two people to make a bargain, in the electric railway industry it takes, as a rule, three. When a large department store decides to change its merchandising policy, it marks down its goods, advertises the sale and clears the shelves. When we decide on a change of price, we usually have to go to a commission and obtain permission to do so. Some of these regulatory bodies, notably that in Wisconsin, are fully alive to the necessity of quick

action and of sympathetic action, and part of the success of the Milwaukee Company is due to the ready assistance which the Wisconsin Commission has given to it. But not all commissions are of this type. One of the tasks which lies immediately before us is that of convincing the commissions of the desirability, from a public standpoint, of allowing considerable latitude in fare structures and opportunity for experiment.

We do not propose to wait until we have the ultimate solution of the fare problem. We propose to help companies to find that solution for themselves and to put into practice right away, if not the best method which may take us years to discover, at least a better method, and one which gives promise not necessarily of an immediate increase in net, but of an increase in patronage from which an increased net will ultimately and inevitably follow.

Keeping Open the Arteries of Trade and Commerce

By
MERLE THORPE
Editor *Nation's Business*



Merle Thorpe

used statistics. Parenthetically, nothing is so dangerous as a perfectly good "statistic" in the hands of an amateur. It becomes a national menace in the hands of a demagogue.

It will take only a little commonsense reflection to understand that "the public be damned" fallacy of 30 years ago was not, nor could it be, the attitude then or now of our public utilities. Yet, from that fallacious premise, and others, have sprung misunderstanding, suspicion, distrust and reprisal, which have taken the form of confiscation, operation, regulation, supervision and a thousand obstacles in the way of efficient operation.

The electric railways got the backwash of this popular antipathy. As a result, the transit facilities in most of the larger cities of the country have fallen behind the standards for other phases of modern urban life. The unwillingness of the people and the people's representatives to co-operate wholeheartedly in solving the problems of mass transportation has brought its own penalty—the penalty of inconvenience, crowding and dangers encountered in using transit facilities, or experienced when walking or driving in congested traffic areas. At the same time, the users of these facilities, whose interests were always brought to the

FACTS are the least developed of our natural resources. Fallacious thinking is responsible for most of our present problems. It follows that remedies for relief are largely the result of starting from the wrong premise, from an unreal situation set up by rumors, half-truths or downright misrepresentation. Whole sections of our industrial life suffer today from industrial fallacies of the past. Perhaps none has suffered more than transportation, particularly electric railways.

Popular fallacies about business are born of old wives' tales, of honest half-truths, of political expediencies, of mis-

fore by "friends of the people" are aware that while the service afforded them has decreased, the price they pay has invariably increased.

We pride ourselves on being a highly intelligent people. Yet the charge still stands that we are a nation of economic illiterates. An example is present in your industry. Business interests and the newspapers, which should foster the freest exchange of commodities and services, should approach traction problems with a sympathetic interest toward their proper solution, but instead they have been indifferent and, in many cases, have lent themselves to partisan politics, which has retarded the growth and business activity of many communities.

Measures for better city transportation are closely interwoven with economic and political life, and require public co-operation for their solution. The problems are complicated and of a technical nature. They should be studied in the light of the community as a whole. But interests of a particular section or group, local politics, prejudice, and selfish interest have prevented, in the past, and continue to prevent, at the present time, the management from doing a real job.

Even responsible business men and property owners understand little of the great importance of local transportation in its relation to the physical, economic and social development of their cities.

Transit deficiency and traffic congestion exact an intangible yet a great toll upon their business and upon property values. Even the street car rider takes little or no interest in constructive measures which would improve the service rendered him, his comfort and convenience. He is wholly indifferent, if he is not found in the ranks of agitators, to increased taxes and expenses, subsidies to school children; yet it is he, in the last analysis, who pays the bill. His mind is full of suspicion and prejudice, because he still believes that the policy of a public utility is that "the public be damned."

Not only the street car riders—we must remember that there are 40,000,000—but the industries and retail businesses whose very lives depend upon mass transportation, are indifferent to the serious problems facing street railway service. They are quick to pick up another fallacy that the street railways are doomed, that they are back-numbers, and must give way to new forms of transportation. Yet any man in his sane mind must realize that it will be many, many years before other forms of transportation will take the place of street cars. And many, many changes will have to be made affecting the entire layout of whole cities before such can come to pass. The hope lies in a better understanding of the complexities of city transportation on the part of the public and the public's officials.

Control of Economic Factors in Operation

Based on a report of the
T. & T. Committee on Operating Expenses

By

JOE R. ONG

Director of Research
Cincinnati Street Railway



Joe R. Ong

reports an increase of 7 per cent in riding on lines with new equipment, or about 2,000 new revenue passengers per new car per year. Other companies which have acquired new cars during the last two years report that riding has held up better on the lines equipped with new cars.

MERCHANDISING METHODS USED TO INCREASE REVENUE

Special traffic stimulators have been tried in several cities in connection with bargain days at retail stores. Some companies have worked out a joint ticket arrangement with theaters, parks, and promoters of athletic games. Others are conducting sales meetings with their employees in their endeavor to increase the sale of rides. One company presents a weekly pass to each new family arriving in the community, with a letter from the manager urging the newcomers to use the street cars, and pointing out the economy and time saved by using the convenient car service for every purpose.

Practically every company reporting has recognized the value of advertising in some form to spread the message of safety and economy in connection with their service. The use of posters and car cards is general. Most companies use newspaper space.

Several companies have increased their revenue through the development of chartered bus business. This is stimulated by the use of both direct mail advertising and posters in the cars as well as newspaper advertising.

It is more difficult to summarize the various things which have been reported as effective in reducing operating expenses. In some cases, perhaps, major reductions can be made at a single stroke, such as the introduction of one-man operation, resulting in a material reduction in trainmen's wages, or the substitution of new equipment for old resulting in a material reduction in the equipment accounts. If the new equipment permits a materially higher speed, then this will produce a further reduction in trainmen's wages.

In addition to reducing car-hours by speeding up schedules, most companies have been endeavoring to reduce total

car-miles to the lowest point consistent with public needs. Traffic checkers have been employed to make a count of the passengers at various hours of the day, and schedules have been made more flexible so that service could be adjusted to meet daily needs. Many companies have been making greater use of their cut-back facilities so that the former headways are maintained in the more thickly populated portions of the city, while service is reduced at the outer ends of the lines. One company, operating a co-ordinated service operates street cars only in densely populated areas, and uses buses to provide service beyond the limits of street car operation.

In connection with the operation of buses, several practices have been mentioned which are worthy of consideration. The use of a vehicle of the proper size for the amount of traffic on the line is mentioned as the way used on one property to stop some of the leaks in bus operation. By purchasing ten single-deck buses to use in place of double-deck buses in off-peak hours, one company has produced a saving of some \$33,000 per year. Substitution of buses for street cars at night, on Sundays and holidays, or at other times when riding is low, has produced a very satisfactory saving in operating costs in several cities.

there is good evidence that the increased crowding of the streets and the cost of travel in private automobiles is definitely limiting the utility of the private motor vehicle. As the character of the public vehicle and the service rendered by it are improved, it is not farfetched to say that the street car and the bus may in the near future be held in higher favor for the growing proportion of daily city travel.

Street crowding, often called traffic congestion, is definitely traceable to the increased riding habit in the private automobile with its higher street occupancy per passenger served. For example, a single-track street car line will carry, at about maximum capacity, 13,500 people in one direction. A similar width of pavement used by private automobiles only will carry but 1,575 people. Thus, it requires practically nine traffic lanes to carry as many people per hour as can be carried by the single-track street car line.

TRAFFIC CONTROL WILL GIVE AMPLE STREET SPACE

Yet, extravagantly as private automobiles use the pavement area in comparison to the more efficient street car, there is ample street space in every city to carry at least twice the present motor traffic with no more crowding than at present. How can this be achieved? Simply by the application of traffic control and regulation measures designed to use the street most effectively. If these are put in force, it will mean that much of the present curb parking on crowded streets will have to be eliminated, progressive traffic signals must be installed in many places, so timed as to speed up, rather than hinder, traffic movement. Many traffic signals already installed will have to be removed, and more rigid control and supervision over the least necessary types of vehicles during the crowded periods of the day must be accomplished. This is not a dream—it can be and is being accomplished. The methods used are not spectacular, they do not cost a great deal of money, but they accomplish much in saving of time and money to the citizens of a city.

Some contend that the traffic problem can only be met by wider streets, more streets, elevated highways and grade separation—all extensive structural changes. All of these devices may have some place in a comprehensive traffic plan, but neither one nor all will ever solve the traffic problem. Often they only tend to aggravate further the present congestion by encouraging less efficient street use by private automobiles. If our present street system were to be used as efficiently as it could be, keeping in mind first the reasonable needs of majority, city streets would easily be able to handle all the present traffic with a liberal factor of safety for the future.

Costs and Competition in Street Use

Based on a report of the
Committee on Street Traffic Economics

By

E. J. McILRAITH

Staff Engineer
Chicago Surface Lines



E. J. McIlraith

NO ONE denies that, in this period of remarkable automotive development, the private automobile has considerably reduced the number of riders on street cars and buses. Nevertheless, I am of the opinion that the effect of the automobile upon the public carrier has been largely overestimated. By far the greater proportion of all motor vehicle riding is new riding created by the automobile, and actually non-competitive in character, although it is true that much of this travel in cities could be quite satisfactorily served by public transportation. The facts are that while automobile registrations were increasing phenomenally, passengers carried on railway cars and buses of the electric railway industry of the United States were also increasing slowly to a maximum in 1926. The decrease from that time to 1930 in number of passengers carried has been only 9 per cent.

The Committee on Street Traffic Economics has conducted a study of the past history of the automobile as it has affected the mass transportation agencies, and made some analysis of what the future may bring. The era of rapid growth in the automobile field has definitely passed. Sales resistance is becoming greater, and the number of persons who may be classed as poten-

tial motor vehicle purchasers is becoming less each year. Since 1923 new equipment purchases in each year have been less than in the year before. This trend will continue for several years. Registration increase in the next five years will probably be only about 10 per cent, although it may amount to 20 per cent. Up to four years ago, the yearly increase had always been 10 per cent and more.

It is our conclusion, then, that the period of most serious competition from the automobile, measured in numbers of vehicles, has already been practically reached. In the larger cities, especially,



J. H. Alexander
First Vice-President



Walter A. Draper
Second Vice-President



W. E. Wood
Third Vice-President



G. C. Hecker
General Secretary



Barron Collier
Treasurer

1931—1932
Vice-Presidents and
General Officers

American Electric Railway Association



A. B. Paterson

Robert M. Feustel

Myles Lambert

H. E. Listman

John Tinmon

A. M. Hill

Newly Elected Members of the Executive Committee
All for Three-Year Terms, Except Mr. Hill, Who Serves One Year

Progress in Meeting Major Problems

Outlined at Advisory Council Session

Coffin Award Presented to Milwaukee Electric Railway & Light Company. Lack of confidence principal deterrent to world business revival, according to Julius H. Barnes

STEPS taken by the industry to solve its problems and a comprehensive outline designed to end the world depression were presented at the Advisory Council session, held at the auditorium on Tuesday night. A large crowd filled the convention hall to hear these vital messages and to witness the presentation of the Coffin Award to the Milwaukee Electric Railway & Light Company.

J. N. Shannahan, chairman of the Advisory Council, opened the meeting, and in his remarks cited the growth of the association and what it has accomplished. He discussed the problems of preserving the investment, securing credit, impressing the public with the essentiality of public transportation, street congestion, improved service, and co-ordination, and told what had been done in the past year toward solving them.

FUTURE OF THE SERVICE A MAJOR QUESTION

"It is proper," Mr. Shannahan stated, "that we should seek to conserve the large investment of the industry. The investor is entitled to fair treatment on the part of the public. Regulation by public bodies should function to permit him reasonable safety and a fair return in earnings, as well as to insure to the public reliable and convenient service at reasonable cost. Unless the former is granted, the latter is impossible. Unless the investor is fairly treated, private capital will be withdrawn to safer and more remunerative fields. Unwise public treatment can sacrifice investments already made in good faith, but it cannot force new money to be put into a public service enterprise. When that condition occurs the credit necessary for improvement and extension will not be available and the quality of service which the



J. N. Shannahan

public has a right to expect will not be possible. Our business has suffered for a number of years from lack of credit. Until at least a portion of past investments is salvaged and reasonable safety provided for the future, this condition will remain. From the investors' standpoint alone, this situation is one to challenge the attention of every fair minded and thinking citizen. But its direct public aspects are of even greater importance. The major question to which we seek to direct attention is not so much what is to become of the local transportation business, as what is to become of the service itself. This is a question that concerns the public even more than it does the investor.

"Of course, it assumes that public transportation service is indispensable and will remain so in the future. There is no need for me to establish for this audience the fact that the service of the companies represented here is a vital necessity to the millions who are dependent upon it for their daily travel

needs. But there are many in this motor age, who, not fully aware of the facts, are inclined to jump to the conclusion that street railways are rapidly outliving their usefulness. Those who hold this view do not realize that despite the widespread ownership of automobiles, approximately 75 per cent of those who travel to and from central business areas in the larger urban centers of the country are dependent upon public transportation for their daily travel needs. Nor are they aware that during the relatively short periods of maximum demand; that is, during the rush hours morning and evening when workers are traveling between their homes and places of employment, public travel facilities are even more vitally necessary than is indicated by figures based upon the total movement throughout the day.

"Any suggestion that public transit facilities can be dispensed with, even in this age of luxurious automobile transportation, is economically and physically inconceivable. No program of street and garage construction would begin to permit everyone to travel in cities by automobiles, even if we are willing to assume that they could afford to do so. The need for public transportation service in urban areas is increasing—not decreasing. Though the widespread ownership of private cars enables many to provide their own transportation, this very convenience of the automobile has created a large increase in social and economic activity and in the habit of moving about.

"Street congestion is today one of the most serious problems of the modern city. As fast as improvements are made in existing arteries they are saturated by the insistent demand for additional street space. We are convinced that the improvement of public transit to the point where the public will be wil-

ing to use it to a larger extent for ordinary travel purposes is an important factor in the solution of the street congestion problem. In fact, this seems to offer the only economically feasible method of remedying the traffic jam of modern cities and avoiding the threat to the stability of hundreds of millions of centrally located property values.

"This industry has not been sitting by waiting for others to aid in the solution of its problems. While seeking public co-operation it has been exerting itself to the utmost to put its own house in order—to improve its technique and methods to the limit of its financial ability. Coming after more than a decade of economic stringency, the additional pressure of the past year has called upon our courage and ingenuity to the very utmost. Nevertheless, it is gratifying to be able to report that very real progress has been made during the past year in the application of modern co-operative research to the important and immediate problem of developing improved types of street cars. Progress has also been made by the Committee on Fare Structures whose purpose is to analyze the problem of street railway fares with the object of developing an equitable and fair system of local transportation rates which will provide not only necessary revenue, but which will tend to stimulate that class of riding needed to balance our load factor so that the transportation system may be made of maximum use to the community.

"If we stop for a moment to consider ourselves objectively, it may help us to realize that our efforts to solve our own problems take on a new significance. If we can do that, we can go back to our appointed tasks to take up the problems of the future, to encounter success and failure, difficulty and achievement, inspired by the realization that we have a vital part in a great enterprise, a great adventure—that of making our country and the world a better place in which to live."

MILWAUKEE COMPANY PRESENTED WITH COFFIN MEDAL

Following Mr. Shannahan's address, President Hanna read the report of the Committee on the Charles A. Coffin Foundation Award and presented to S. B. Way, president and general manager of the Milwaukee Electric Railway & Light Company, the Coffin Medal. William A. Daniels, representing the Employees' Association of the Company, was given the accompanying check for \$1,000. Abstracts of the briefs presented by the four competitors in the contest appear elsewhere in this issue.

The address of the evening was made by Julius H. Barnes, chairman of the board of the Chamber of Commerce of the United States. "Lack of national

and international confidence is the chief cause of the present difficult situation and its restoration is the chief need of the world," Mr. Barnes declared. "The evil effects which flow from lack of confidence are apparent. It creates caution and fear, and shrinks the normal expenditures of ordinary living which maintain manufacturers, merchants, distributors, transportation and factories. It results in reduced consumption, lowering of commodity prices, the sale at low prices of good securities and prevents the flow of capital from the centers where it tends to accumulate in idleness to the places and employments in which it is needed.

SOUND COURSES OUTLINED TO RESTORE EQUILIBRIUM

"The time has come when business men of the world must take determined action in defining sound courses under which a restored equilibrium of business may reflect into a restored welfare of whole peoples. This program," Mr. Barnes continued, "must include in its essentials these points:

"1. France and Germany must earnestly and sincerely seek an accord by which the world shall have a political moratorium. The time has come for nations to think less about borders and frontiers, and more about expanding interchange of goods and finance on which will rise the welfare of all peoples.

"2. Great Britain is assured of a friendly understanding and co-operation in these days of trial and perplexity. Balanced budgets and national economy will rebuild her financial positions.

"3. For all of Europe, an atmosphere of peace and confidence would greatly contribute to the welfare of their peoples. Business men hope the coming disarmament conference in Europe will point the way to lighter burdens laid on industry and on individuals in all these countries. More than that it should create a new spirit of international good will, thereby stimulating international finance and international trade.

"4. South America with its vast potentialities for trade and commerce will lay the foundations for a new confidence. But political instability repels timid capital. There must be a realization that self government assures a continuity of administrative responsibility under which capital may venture.

"5. Here in America we also have the problem of how to restore national confidence in such a way that our resources and energy shall expand the fabric of trade until it takes up the fringe of unemployment. These things are suggested to restore confidence and enterprise in America: (a) Join the World Court, and thereby show international co-operation and good will; (b) Pre-

pare to support a sound program of international finance to follow the short moratorium; (c) Press for effective results from the coming disarmament conference; (d) Stretch and spread employment to the utmost; (e) Revise the 40-year-old anti-trust laws which today destroy the small business; (f) Frame our tax requirements to spread justly and fairly where it can best be borne without injury; (g) Give regulated industry like the railroads a fair chance to maintain their earnings and credit; (h) Exercise economy in national expenditures; (i) Reassure the individual American that we shall preserve the traditions of private enterprise, and that governments shall be an empire only to preserve fair play between its people; (j) Continue to adjust the protective tariff; (k) Use the great reservoir of American sympathy and its genius for organization in caring for cases of individual misfortune, and (l) Avoid in any form, donations from the national treasury as charity dole.

"6. For all self-governing peoples of the world this period of distress should invoke a sober study and understanding of the relations of governments to the individual activities of their people. Clearly, after the occurrence of these last few months, people who aspire to self-government must demonstrate their fitness for such exercise of power. It is necessary that they clarify their conception of the province of government.

ECONOMIC FORCES BETTER UNDERSTOOD

"Today in America, there has never been such an understanding of the economic forces which have culminated in this depression, and with it never such quick human sympathy as desires to be helpful in alleviating the misfortune and distress that flows from this dislocation. This depression seems deeper because of the advanced standards to which we have attained. After all the real capital of people rests in their character and their ability. They can rebuild from misfortune. They can re-create and reconstruct. But they need for that a confidence resting on conviction that they have a free and fair opportunity. In that respect there is a solemn obligation on government that it shall preserve that fair field of opportunity. There is a solemn obligation as well on business leadership that it shall recognize that modern business is invested with welfare of all its workers and that it must labor unceasingly to advance that welfare. This I believe to be the conviction of the business world today.

"This spirit in business leadership and the evidence that self-governing people are possessed of understanding, self-control, fortitude and courage will recreate confidence—the first prerequisite to world recovery."

American Committees

Had Active Year

MANY noteworthy accomplishments are recorded in the reports of the committees of the American Association for the year just ended. Addresses covering the work of the Committees on Fare Structures and Street Traffic Economics were presented at the general session of the association on Thursday, and appear in abstract among the other addresses. Reports of the special committees on Revision of Constitution and Bylaws, and Employee Relations are presented below, as are the reports of the Standing Committees on Publicity and National Relations.

National Relations

The Interstate Commerce Commission, in a series of hearings, has had under consideration the problem of highway transportation, and the Washington office and its staff have been utilized by the attorneys of several member lines in the preparation and presentation of evidence in the aforesaid hearings. Six member companies utilized the Washington office and library for several days, and the general counsel and his staff assisted in the preparation of exhibits and evidence of ten witnesses who took two full days to put in their evidence in the aforesaid hearings.

Following the presentation of evidence by six member company lines, and on account of the importance of the general subject of highway transportation, the general counsel, at the direction of the Executive Committee, prepared and filed a brief and argument with the Interstate Commerce Commission on behalf of the American Electric Railway Association, setting out in considerable detail the position of the Association on this all-important subject. Copies of such brief and argument were printed and distributed to all member companies, State and national associations, public utility commissions, State officials, chambers of commerce, and parties in interest generally.

For several years the committee has been endeavoring to obtain a clarification of the Interstate Commerce Act so that electric railways reporting to the commission may know what their status is under the law. The position taken by the Government concerning interurban electric railways has raised such a fog of uncertainty in regard to the position of such railways under the Interstate Commerce Act that a final settlement of this troublesome problem must be had before any electric railway

that reports to the commission may be certain of its status.

Efforts have been made from time to time to interest Congress in the subject, but in the absence of agreement on the part of the Interstate Commerce Commission and the state public utilities commissions and the industry as a whole, no progress has been made in obtaining the necessary statutory enactments. Representatives of your committee have had several conferences, during the past year, with representatives of the Legislative Committee of the National Association of Railroad and Utilities Commissioners, and with representatives of the Interstate Commerce Commission, for the discussion of proposed legislation to remove the ambiguities in the Interstate Commerce Act. Such discussions and conferences, it is believed, have materially advanced the ultimate solution of the problem of clarifying the act. Until such legislation is passed or until the Supreme Court by a decision clarifies the subject, no electric railway reporting to the commission may be at all certain of its status under the excluding language of various provisions of the act.

At the request of certain member lines, the Washington office made a study and report on the subject of the Safety Appliance Acts and their application to electric railways reporting to the commission as found in the various decisions of the Federal courts. In connection with this subject it should be pointed out that the Safety Appliance Acts generally require electric railway equipment operating on electric railroads reporting to the commission to comply with all their provisions.

At the direction of the Executive Committee of the association, the Washington office canvassed electric railway mail-carrying lines (both member and non-member lines) in regard to the commencement of an action for the increase of electric railway rates of mail pay. In the last decision of the Interstate Commerce Commission fixing rates of mail pay for short-line steam railroads, the rates so fixed were considerably higher than comparative rates paid to interurban companies carrying mail. It was thought that possibly a case might be prepared to enhance the earnings of interurban companies from

mail pay, and a bulletin was put out to all electric railways reporting to the commission asking co-operation. After the receipt of a number of letters indicating a lack of interest, and a request on the part of the heaviest mail pay electric line member that the subject be dropped for the present, the matter was filed for future reference and will again be taken up at a more propitious time.

In this connection, the committee points out that an inequality exists in the rate of pay fixed for electric interurban lines as compared to short-line steam roads, and it is the thought of the committee that a persuasive case could be made before the commission to secure increased rates for interurban mail-carrying lines.

In the 71st Congress there were three sessions. The bill in which this industry was most interested as a constructive piece of legislation was the Motor Bus Bill. It passed the House early in the 71st Congress, but failed to pass the Senate. It will no doubt be a measure of major importance during the coming session of Congress which convenes in December. In passing, the committee calls attention to the fact that the December Congressional session is so evenly divided between the major parties that at the time this report is written no one can predict with accuracy which party will organize and have control of the committees in the House of Representatives. The natural result of this condition will be that constructive legislation will be difficult to pass. In other words, the power in Congress will be exercised without the restraining effects of party responsibility. The committee looks for a considerable number of bills proposing legislation adverse to the electric railway industry's interest, and on this account the committee renews its request, and desires to emphasize it this year, that all member lines respond promptly to calls for information and assistance in legislative matters.

Revision of the Constitution and Bylaws

After thorough discussion the committee agreed that it would be inadvisable to attempt to carry out the original plan of effecting a complete revision of the association's basic document this year. It was felt that the drafting of a complete revision should be deferred to give more time for further study to the many angles of the problem. A plan was discussed for anticipating the

proposed complete revision of the constitution and bylaws by changing the name of the association this year to accord with the broader field of interest of its member companies than is indicated by the present name. The committee decided, however, that the advantages to be gained from a change in name at this time do not outweigh the disadvantages that might ensue from premature action on this detail before the entire problem of constitution revision is worked out.

The committee recommended the substitution of the following paragraph in place of four existing paragraphs in Section IV (a) dealing with membership:

"One of the qualifications for company membership shall be that in the opinion of the Executive Committee, the applicant shall be conducting its business in conformity with the policies of this association. In considering applications for membership the Executive Committee should seek the advice of member companies in the territory in which the applicant conducts its business and shall give consideration to the standing of the applicant among such neighboring members."

The committee also considered two changes in the constitution recommended to it by the Nominating Committee. The first of these involves a reduction in the number of vice-presidents from four to three, and the second provides for the creation of an additional operating member at large on the Executive Committee to serve for a term of one year. The Nominating Committee suggested that a move should be made this year toward eliminating the practice which has grown up of nominating the vice-presidents in progression through four grades to the presidency. Adherence to this precedent has meant in effect that the man nominated for fourth vice-president has been named for the presidency of the association five years before the year in which he is expected to serve. For a number of years many officers and members of the Executive Committee have held that this custom is not good practice for the association to follow, and it has been urged that a change should be made in the constitution which would change this practice.

The second change recommended by the Nominating Committee, that an operating member at large be added to the Executive Committee to serve for a term of one year, was proposed in order that all interests concerned might be fully represented on the Executive Committee next year when the important subject of complete revision of the constitution will be under consideration again. The suggested change will also maintain the present number of operating company representatives on the Executive Committee, the new office of member at large for a one year term taking the place of the fourth vice-president.

After full consideration the committee voted unanimously to adopt the changes in the constitution recommended by the Nominating Committee.

Another item considered was a suggested addition to the bylaws growing out of a question of interpretation with respect to the method of calculating dues payable by operating member companies, the particular point involved being the meaning of the phrase "gross receipts derived from electric railway operation and other forms of transportation service" as used in Paragraph (b) of Section XIV. The interpretation placed upon the present Paragraph (b) of Section XIV by the Finance Committee was that gross receipts used for calculating dues should include all operating revenue accounts from Nos. 101 to 119, inclusive. The drafting sub-committee agreed with this interpretation of the present bylaws but felt that it was inadvisable, for the future, to include Income Account No. 118 (Power) in calculating dues. The following paragraph was thereupon adopted to be inserted between the present first and second paragraphs of Division (b) in Section XIV:

"Gross receipts as used herein shall be the sum of operating revenues from all forms of transportation engaged in by the company and its controlled subsidiaries, and shall include operating revenue accounts Nos. 101 to 119 inclusive, with the exception of Account No. 118 (power) as prescribed by the Interstate Commerce Commission Classification of Accounts for Electric Railways, or their equivalent for the other forms of transportation."

In conclusion, the committee recommended strongly that the work of complete revision of the constitution and change in the name of the association be continued, and that every effort be made to complete the entire reorganization of the association's structure during the next association year.

Publicity

At the beginning of the present association year, the Committee on Publicity adopted a program of eight major subjects with which it should deal during the year. Those subjects were: traffic congestion relief, economy and safety of public transportation, community value of co-ordinated public transportation, selling public transportation, accident prevention, intercity service, modernized franchises, and tax relief.

Traffic congestion relief has been featured above other subjects. The committee has tried particularly to draw the attention of newspapers, periodicals, civic bodies and public officials to the causes of traffic congestion and approved remedies for it. In all publicity material directed to these sources, the committee has endeavored to tie up the situation with the broader aspects of all urban life, in order that the problem

might not be dismissed as a minor thing which, if ignored, eventually would solve itself. The committee has received a cordial and intelligent response to its effort, especially from the daily newspapers.

Despite the fact that all accident prevention committees of the various associations have been disbanded, the publicity committee has continuously carried on a safety program. It regrets very much the dissolution of these accident prevention committees, because in previous years they have been the source of many valuable advertising and publicity suggestions. Inasmuch as accidents still are draining the industry of about 4 per cent of its gross receipts, the committee suggests consideration of the advisability of a study designed to co-ordinate the accident prevention work of the association and the National Safety Council, Street Safety Section.

Progress has been made in the study of direct selling of transportation, but this situation still is in an incipient state, and only a brief report can be made on it. The director of advertising has co-operated with one of the major companies in canvassing 6,000 families to get their reaction on service, and to lay a groundwork for intensive direct sales planning. The survey was made by 30 employees in their spare time, and results were very enlightening and satisfactory. This work continues.

The advertising section at present is engaged in putting into shape material forwarded from many parts of the country in connection with community value of co-ordinated transportation. Limited service has been rendered in connection with modernized franchise in intercity service and tax relief subjects. The reason for this is that there have been few developments on these three subjects within the association during the last year.

Because of unusual economic conditions, which varied greatly in different parts of the country, the committee endeavored this year to make its service to members more personal than ever before. The writing of local copy, it was felt, would be most beneficial. Primarily, an issue of the loose leaf advertising folder, containing some 2,500 samples of advertisements and posters, was prepared and distributed. Companies then were urged to write the association special requests. The response was encouraging, an average of ten a week being received throughout the year. This was approximately double the special requests for the previous year and also was the high mark for any special association service.

The committee believes that recent developments and improvements in portable talking movie machines make it advisable the feasibility of entering the

talking film field be carefully considered. A shortage of speakers always has existed within the industry, and as a result publicity has been restricted. The conviction has existed for a long time that the industry's story should be told more broadly by word of mouth. Particularly there should be a speaker at every State and sectional transportation meeting, and at as many large business gatherings of all kinds as possible to present the industry's problems from a national standpoint. This program has not been carried out because of lack of time, cost and other considerations. The committee believes that if a practical portable talkie projection machine can be obtained, and the proper films made to go with it, talking programs could be presented at many such meetings.

As to the major subjects to be followed during the coming year, the committee believes that the eight approved at the outset of 1931 still are the most important confronting the industry and it would again recommend that they be given major attention.

Employee Relations

It was decided to focus attention of the committee for this season largely on the following activities:

1. Promulgating the plan for training leaders for employee conferences of all kinds by sponsoring training courses wherever and whenever such courses are desired locally and are financially feasible.

2. Studying, with the aid of the research facilities of the association, what appeared to be topics of outstanding interest in the personnel field, including: (a) Bonuses and awards. (b) Retirement annuities (pensions), and group or other insurance schemes. (c) Employee training and follow-up.

3. Studying the whole field of employee relations with a view to recommending, for the guidance of future committees, the topics most likely to prove profitable for investigation.

4. Providing such participation in the annual convention program as would help to arouse interest in the recommendations of the committee. Included were plans for a luncheon conference to be sponsored by the chairman and for an exhibit of the personnel work of member companies. A leader-training course, to be held at the time and place of the convention, was considered but was deemed impracticable at this time.

Subcommittees were appointed to carry out assignments made in accordance with the above plans. At the later meetings of the committee the work of these subcommittees was reviewed and their recommendations acted upon. Their reports, which have had the consideration of the main committee, are presented as appendixes.

At the beginning of the season the committee had hoped to arrange for four or five regional training courses for conference leaders. On account of the adverse conditions in the industry it proved practicable to hold but two courses, one in Chicago and one in Boston. Both were successful, each in a slightly different way although the scope and plan of both courses were similar. In Chicago there was greater interest among electric railways and a slightly larger attendance. One result of the Boston course was the appointment of an inter-utility committee (electric railway, electricity and gas) to continue the interest through some kind of informal "get-togethers." A leaflet was prepared setting forth "The A.E.R.A. Plan for Training Leaders to Conduct Conferences."

A special subcommittee, after a careful study of this subject, came to the following conclusions: That industry should take steps to formulate its own plans for retirement of aged and disabled employees based upon uniform principles; that a portion of the problem of old-age maintenance should be placed upon the individual, or in other words, permanent retirement plans should be contributory and not entirely free; that such plans should be carefully calculated, trustee and made financially sound.

The same subcommittee reports the following conclusions under the above heading: That the recent depression,

with its consequent unemployment, has emphasized the real value placed upon group-insurance protection for the employee, and that group insurance acts as an acceptable tie-in between employer and employee; that group insurance programs should be built upon a contributory rather than a free basis; that programs covering health and accident are highly desirable, whether separate or tied in with group insurance.

Research by the subcommittee assigned to this topic disclosed enough actual and extended experience with bonuses and awards, especially in connection with accident reduction, to furnish a factual basis for intelligent analysis of their local applicability on any property. Many companies are securing substantial benefits from bonus plans. The subcommittee has performed a helpful task in indicating the trends in this field, without going into details of particular plans.

In view of a decision not to hold an Atlantic City training course this year, it was decided to arrange for visits by a representative of the committee to conveniently located properties with a view to arousing greater interest in the conference plan. Mr. Cox made the two-week tour in which he visited a number of properties in Virginia, Kentucky, Ohio, and Maryland and in each city gave such assistance along personnel lines as was desired locally and was feasible in the limited time available.

Old and New Executive Committees Hold Convention Meetings

A FINAL meeting of the outgoing Executive Committee was held at Atlantic City on Sunday evening, September 27, just prior to the opening of the 50th Annual Convention. Brief reports were received from the various convention committees indicating that all preparations had been completed for the opening on the following day. Chairmen of several of the standing and special committees outlined briefly the reports which their committees had to submit. At the conclusion of the meeting, D. W. Harvey, general manager Toronto Transportation Commission, invited the American Electric Railway Association to hold its next annual convention at Toronto in conjunction with the convention of the Canadian Electric Railway Association.

On Thursday afternoon, the first meeting of the new Executive Committee was held with the new president, G. A. Richardson, in the chair. F. W. Doolittle, chairman Finance Committee, spoke at some length on the financial affairs of the association, and outlined a program for the coming year which

met with the unanimous approval of the committee. President Richardson announced the appointment of a committee to co-operate with the managing director in the preparation of a brief to be presented to the United States Chamber of Commerce in connection with its study of the urban transportation problems. Appointment of a number of committee chairmen for the coming year was also announced as follows:

Finance—F. W. Doolittle.
Subjects and Meetings—Walter A. Draper.

Publicity—Barron Collier.
Advisory Equipment Financing—Thomas Conway, Jr.

Revision of Constitution and By-Laws—F. W. Doolittle.
Co-operation with State and Sectional Associations—F. R. Coates.

Employee Relations—A. B. Paterson.
Fare Structures—Edward Dana.

Insurance—H. B. Potter.
Manufacturers' Advisory—Safford K. Colby.

Street Traffic Economics—E. J. McIlraith.
Taxation—E. W. Wakelee.

Policy—J. H. Hanna.

Coffin Award Won by MILWAUKEE

T.M.E.R.&L. brief tells how riding and revenue were increased and service improved. Notable records of accomplishments were also presented by electric railways in Baltimore, Des Moines and San Francisco

A CHIEVEMENTS of an unusually high order of merit were recorded by each of the four contestants in the ninth annual contest for the Charles A. Coffin Award made to "that electric railway company within the United States and Canada which during the year has made a distinguished contribution to the development of electric railway transportation for the convenience of the public and the benefit of the industry." As in previous years, six principal factors were considered in making the award. These are: (1) more riders and more revenue; (2) a friendly public; (3) lower costs and increased reliability of service; (4) increased safety for riders, employees and the public; (5) co-operation between management and employees; (6) financial accomplishments. Presentations were made by the following

companies: Des Moines Railway, Market Street Rail-

way of San Francisco, the Milwaukee Electric Railway & Light Company, and the United Railways & Electric Company of Baltimore. These presentations show the successful efforts of all of the competing companies in improving the service rendered by them to the public, their progress in merchandising rail transportation, the exercise of great ingenuity in planning and carrying out programs of improvement against the influence of many opposing forces. All of the contestants have reason to be proud of their accomplishments, and it was only after prolonged consideration that the committee selected the Milwaukee Electric Railway & Light Company to receive the 1931 prize.



ture on May 4, 1930, was accelerated by the demand of the city of Milwaukee that a single fare schedule should be applicable to any area annexed. The Railroad Commission did not recognize the city's argument as valid, but it did make the fares apply within a radius of about 5.5 miles, instead of 3.7 miles, regardless of political subdivisions. The plan adopted made extensive use of the weekly pass as told in an article published in the September issue of the JOURNAL. In the first year after the change, revenue was fully maintained in the face of the hard times, and riding increased 8.65 per cent, whereas car-hours decreased 6.9 per cent. Peak loads were reduced because of economic conditions, but the total traffic increased because of the short-haul, off-peak riding induced by the pass.

The combination of 10 cents cash (formerly 7 cents) and the pass reduced the time of fare transactions by 60 per cent thereby raising the net operating speed in twelve months from 9.22 to 9.73 m.p.h., while the ratio of one-man operation rose from 82.2 per cent to 89.5 per cent. A further departure from traditional practice was the removal of all direction, route and intersection restrictions from transfers. This resulted in a pass type of transfer which is good up to 1½ hours after the original time of tendering fare. The effect of this hourly pass was to increase cash fares in the face of the seasonal downward trend. Apparently, this is due to the creation of short-haul round-trip riders.

Facilities of the Milwaukee company have been increased steadily year by year. The modernization of the several interurbans extending out of the city has involved the largest single outlay



The Milwaukee company furnishes coordinated railway and bus service to nearly 1,000,000 people

"CONTINUITY in progress" is the phrase selected by the Milwaukee company to describe the achievements recorded in its presentation. The brief points out that when an undertaking has been under the same direction for more than a generation, sensational changes from one year to the next are unlikely. The achievements recorded are the fruition of policies long and persistently pursued. Nevertheless, the company was able to meet the letter of the contest specifications through the work done in the immediate past.

Improving service to attract patronage and adjusting rates to popularize the use of this service were outstanding achievements of the Milwaukee company. "More riders and more revenue" were accomplished literally despite the devastating effect of widespread unemployment.

The introduction of a new fare struc-

of capital. The company was faced by the alternative of allowing these interurbans gradually to go to seed, or bringing them up to a standard that would quicken Milwaukee's growth to the status of a great metropolis. A similarly progressive policy has been adopted for the expansion of freight business, including co-operation with motor-truck concerns for store-door delivery.

That the company foresaw the possibilities of motor bus operation, and knew how to protect itself against competition, despite the absence of regulation, is apparent from the fact that its interurban bus operation goes back to 1919, its city feeder bus operation to 1920, and its city de luxe operation to 1923. Almost all of such operation was new mileage. Rail lines have been extended and modernized—not sacrificed. In 1930, interurban bus vehicle-miles were 23 times greater than in 1921, advancing from 100,032 to 2,320,175. Round-trip route-miles at the same time increased from 59 to 1,938.6.

This company pioneered in the United States with the use of powdered fuel and high-pressure steam. Its efficient power practices are reflected in the low cost of energy delivered to the railway department. In substation work



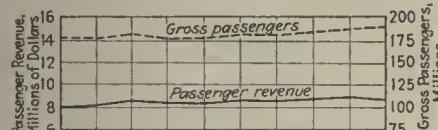
Establishment of improved rapid transit service to outlying towns has been an outstanding accomplishment of T.M.E.R.&L. Company

specialized machinery. The passage of time has demonstrated that these practices are sound and economical.

Much could be said of safety practices and policies, but the measure of efficiency probably will always remain the percentage of gross earnings demanded for the injuries and damages account. In this respect, the Milwaukee company reports that this ratio fell to 2.76 per cent in the first year of the new fare structure. Among special achievements of the safety work are: Reduction of treadle accidents through various improvements; development of a clinic for accident-prone trainmen, which has raised all but a hopeless few to records better than the average; successful use of the spirit of emulation in attaining and retaining high percentage of men completely free of chargeable accidents for periods of one, two and three years; interest-arousing methods of discussing accidents by means of a portable traffic laboratory, and by showing that greater safety with greater speed raises the bonus.

Since 1911, the company has dealt with its employees through an Employees' Mutual Benefit Association whose activities probably are the most varied in America. Through a plan whereby employees pay 75 cents a month dues and the company pays 1.25 per cent of operating revenue, it is possible to give the members a great variety of benefits in health work, pensions, insurance, social activities, and education for every helpful purpose. The attainment of twenty years of unbroken industrial peace is offered as an argument for the success of this plan.

In 1921, Milwaukee inaugurated applied psychology in the selection of trainmen. Since the first work along these lines, it has improved its methods to the point where nearly all the men who show superiority in the tests prove equally superior in practice. So satisfactory have been the results, that psychological selection has been extended to such non-manual employment as carhouse clerks, in addition to power, substation line and shop jobs.



Both the number of passengers carried and the passenger revenue of T.M.E.R.&L. Company have been increased in recent years

this company was also among the first users of the mercury arc rectifier. The brief outlines changes in substation practice, including the introduction of automatics. The modernization of the interurbans was accompanied by improved voltage, obtained chiefly through increasing the number of substations. Trolley and span wire breaks are continually decreasing. Composition trolley wire is saving about one-third of the renewal cost. Particularly interesting is the graphiting of trolley wire which has helped greatly to make possible the 100 per cent use of trolley shoes.

The statistics presented show that with equipment of rising average age, pull-ins have been reduced and maintenance cost cut steadily from year to year. Special attention has been directed to betterments in air brakes and treadle-door mechanisms, whereby the braking distances have been shortened and door accidents reduced.

Outstanding achievements of the way and structures department were the introduction of chrome nickel special work and higher standards of concrete track construction, with liberal use of

One branch of the Employees' Mutual Benefit Association is an educational department, which, in the course of eleven years, has grown to the extent of offering about 100 different courses. Many of these courses are of direct value to different types of transportation employees. All E.M.B.A. lessons are free, regardless of the student's performance. If outside courses are taken, the expense is defrayed by the E.M.B.A. upon evidence of satisfactory completion by the student.

When the original merit and demerit system was widely tried by electric railways nearly a generation ago, the Milwaukee company accepted it on the basis that the permanent success of such a scheme depended upon assuring the employee continued financial benefit from better work. The fear motive was regarded as of no permanent value. Time has justified this policy. Instead of dropping the grading system for platform men, Milwaukee has revised and expanded such grading since 1914. Furthermore, the principle of mutual gain-sharing has been extended to an increasing variety of jobs in all the engineering divisions and even to certain kinds of clerical work. In general, the men receive 40 or 50 per cent of the savings due to more efficient methods. Since the company carries the administrative expenses of the bonus system, the employees really get the lion's share.

There are two outstanding financial achievements of the company. First, the fixed charges have been consistently reduced. In 1920 the funded debt was 52 per cent. Furthermore, in 1930 the total capitalization was about \$9,000,000 less than "total property and plant," thereby bringing the funded debt ratio down to 48 per cent.

An achievement of the current year has been the redemption of 6½ per cent notes which are not due until 1933, and the calling of 7 per cent War-time preferred stock. This saves \$100,000 per annum in fixed charges at a time when such savings count most. Moreover, the remaining securities are enhanced in value.

Second, the record of the company in the sale of preferred stock to customers may be summarized by stating that professional salesmen have been engaged in this work since its formal organization in 1918; that the company has paid dividends on its preferred

stock without a break for 30 years; and that the price of its 6 per cent preferred in recent years has fluctuated less than United States 4½ per cent Liberty Bonds.

Stability Achieved at Baltimore

TODAY residents of Baltimore can say of their street railway service not only that it is up-to-date, that its fare is reasonable, and that it is financially a stable and dependable industry, but they can say, in a sense never possible before, that it gives them "rapid transit." Behind this lies a record of accomplishment ably presented in the company's brief for the Coffin Award. A policy of street railway management and operation, shorn of display and directed to the achievement of stability, produced in 1930, for the United Railways & Electric Company of Baltimore, a depth of public confidence, a soundness of financial rating, and, for the past year of depression, a relative constancy of patronage and revenue sufficient to demonstrate the inherent vitality of a carefully guided transportation utility.

First there confronted this company the need of a rate of fare commensurate with modern costs and service demands. The years following the World War had witnessed a succession of "street car fare cases" before the Maryland Public Service Commission, each one approached by the company with the hat-in-hand manner, almost apologetically, each one fought by the People's Counsel, each increase granted grudgingly. None of these rates began to produce a rate of return approaching the 7½ to 8 per cent returns earned by other utilities and sanctioned by public regulation and the courts. In the face of this situation, this company began, on Aug. 1, 1927, its fight for legal sanction of the principle that a rate of return of 7½ to 8 per cent should also be approved for electric railway utilities.

It began also at the same time a fight for a proper and adequate depreciation reserve. For many years public regulation had decreed that the amount to be laid aside annually by this property for depreciation should be 5 per cent of its gross revenue. As a part of its case for a fare that would produce a just return on the value of its property, the company contended for a method of computing depreciation that would put a stop to the direct annual losses in equity, accruing to the owners of the property because of the lack of balance between actual depreciation and the depreciation reserve.

The fight was carried finally to the United States Supreme Court, which, on Jan. 6, 1930, rendered an opinion that depreciation allowance is properly

figured on present value, and that any attempt to enforce rates yielding less than 7½ per cent (in this case 7.44 per cent) was as confiscatory for an electric railway utility as for any other utility. As a result of this decision, a straight 10-cent fare went into effect on Feb. 6, 1930.

Then began the second stage of the company's program—service improvement. Throughout the summer

of 1929, the staff of the company had worked on plans and specifications for new rolling stock, and early in the fall, a definite statement of a conservative program of service improvement was publicly made. This program involved the purchase of 50 modern street cars. More than three months before the Supreme Court's decision was handed down, bids on the construction of these cars were asked for. At least two weeks before the decision arrived, contracts had been awarded. So encouraging were the company's operating results after the new fare became effective that the board of directors promptly authorized an expansion of the improvement plans to call for the purchase of 150 new cars instead of 50, and to include a three-year program for rebuilding and speeding up 300 cars then in service. It was possible to announce



Speedy service with attractive new cars has won popular favor in Baltimore

this publicly within two months after the new fare had gone into effect.

The third step in the company's program was to solve the problem of rehabilitating electric railway credit. Faith in the soundness of this company's position even before the United States Supreme Court's decision and the launching of its service improvement program, was based upon the apparent stability of its earning power as shown in the statements of its gross earnings over the past six-year period. In this time the company's earnings have scarcely varied more than \$500,000. But after the decision in "the Baltimore Case," faith in the company's stability and belief in the soundness of its credit increased to a notable extent.

A readiness to listen to public appeals for reasonable expansions and extensions of service helped in 1930 to continue and to enhance a favorable state of public understanding and co-operation with the company. In spite of the fact that 1930 was not generally viewed as a favorable year for undertaking expansions and extensions, this company, during that year, added four new bus lines; double-tracked a single-track car line in the suburbs for a distance of three-quarters of a mile; built new track, loops and curves at sixteen different points on the system for more efficient operation of the new cars, and carried on for the entire year the operation of a 25-cent de luxe coach line introduced in Baltimore in the fall of 1929. This line proved unprofitable, and was given up at the end of the year.

With all these advances in the promotion and improvement of the company's service, operating expenses in 1930

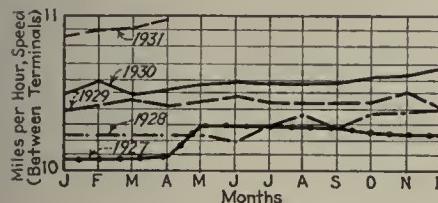


The information bureau of the United Railways & Electric Company of Baltimore answers 100,000 questions a year

were \$300,083.78 less than those of 1929. In addition to this, fixed charges were reduced \$102,200 through the retirement of the portions of funded debt to which reference has been made.

Despite higher operating speeds, heavier street traffic, etc., the company had a decrease of 5.2 per cent in total accidents in 1930 compared with 1929. No distinction is made in the figures between "Chargeable" and "Non-Chargeable" accidents. Since 1919 street railway accidents of every sort in Baltimore have been reduced 38 per cent.

None of these accomplishments would have been possible without the most unselfish, thoroughgoing and enthusiastic employee co-operation. During 1930 a series of "Public Information Conferences" was inaugurated with employees who were members of neighborhood and community associations in Baltimore. Through this system there was present at each neighborhood improvement association meeting during the year a United Railways' man, a



Average speed of street cars has been substantially increased in Baltimore

respected resident of the neighborhood, fully equipped to answer all questions about street railway problems of that community or of the city generally, or authorized to see that the questions were fully and frankly answered by some qualified person in the company's organization.

A suggestion box system, calculated to make of the company's 5,000 employees a "Better Service Army" constantly on the alert for chances to improve service and produce economies, made a remarkable record in 1930. A regular and permanent system of group conferences for groups of supervisory employees, reached, in 1930, a point of perfection greater than it had previously attained. But perhaps this company's outstanding accomplishment affecting the relationship between its men and its management lies in the changeover from two-man to one-man operation when the new cars went into service, involving a total reduction in platform personnel of 32.8 per cent. It was accomplished with the utmost smoothness and lack of friction by the simple expedient of making most of the new installations during periods of the year when additional men would normally have had to be hired.

In general, this company's method of merchandising its service involved

frank publicity about its affairs, the distribution of information about the company's business and its service, making it easy to use the cars and buses conveniently by inviting queries of all sorts; contacts with all public officials whose work affects the company's business; performing free advertising services for civic bodies engaged in civic or neighborhood promotional or charitable affairs; the swift and satisfactory adjustment of service complaints, and promoting the use of the service not only by these means, but by advertising designed to increase public realization of the superior economy and convenience of street car riding.

Substantial Economies Effected at Des Moines

THE Des Moines Railway claims to have demonstrated that street cars can be operated efficiently at very low cost in medium-sized American cities, and that they must, therefore, be continued in these cities as the principal mode of public transportation. Of all its accomplishments in 1930, that of greatest interest to the entire electric railway industry is this claim to efficient operation at low cost.

All cars in Des Moines were operated by two men during the first half of 1930. Complete changeover to one-man operation of cars was effected in the six weeks from July 4 to Aug. 18. Consequently, the full economy of one-man operation was not realized during 1930. Nevertheless, the operating ratio for the year was 62.26.

This healthy condition of the Des Moines Railway today stands out in striking contrast to that prevailing before the advent of the present management on July 16, 1929. In early 1929 a labor dispute which had seethed for years was as yet unsettled. Fifty archaic trolley cars with wooden seats were operated daily. Two men were kept at work on every street car. The old company was hampered by public and political ill will, and hopelessly mired in receivership.

For years the progress of the company had been spotted with strikes, fare difficulties and occasional suspensions of service. During 1921, a model service-at-cost franchise had been

granted by the city. At the same time, a new union contract had been signed which provided for the employment of two men on every car until 1940. This contract closed the door to the main escape from increasing expenses. The company asked that a new contract be signed with the union and that the operation of one-man cars be permitted. The union refused to change the contract, and was upheld in its stand by the State Supreme Court. Revenues continued to drop. The introduction of \$1.25 weekly pass in 1926 helped to remedy the decline, but did not completely cure it. The company passed into the hands of the receivers, and finally was sold to the present owners.

Among the difficulties which confronted the new management were the following:

1. An operating expense of 27 cents per car-mile, without depreciation.
2. A tax burden that had increased by leaps and bounds until it consumed 10 per cent of the total gross revenue of the company.
3. A strongly organized disgruntled group of trainmen, who had been concerned in the past in numerous strikes.
4. Intense opposition to one-man cars. Efforts had been made for years to break the contract that prohibited the operation of one-man cars until 1940. The new management had not purchased this contract with the balance of the property at the receiver's sale, and therefore was confronted with the necessity of either entering into a new union contract providing for one-man operation, or of refusing to



The Des Moines Railway has demonstrated that street cars can be efficiently operated and at low cost in medium-sized American cities

deal with the union as an organization.

5. A deplorable state of public relations. Newspapers were extremely unfriendly. The property for ten years had been the campaign issue of politicians. Public ill will had been fostered in a large measure by the struggle between the trainmen and the company.

6. Thirty per cent of all street cars were obsolete and unfit for operation under modern conditions.

7. One hundred and one fairly modern cars not equipped for one-man operation.

In addition to these immediate problems, it was necessary to develop ways and means of turning a decreasing and insufficient net revenue into a figure that would warrant the continuation of the property as a railway undertaking.

Accomplishments recorded during 1930 include the following:

1. Operating costs without depreciation were reduced from 27 to 17.62 cents per car-mile. This was accomplished by the elimination of dead wood in all departments, and through consolidation and elimination of departments.

2. Through efforts of the company, a new law was passed by the State Legislature which places tax jurisdiction of public utilities under the State tax commission instead of the three city, State and county bodies. It is believed that taxes will be greatly reduced under the new method of assessment.

3. During the year 1930, a previously hostile group of trainmen has become a decidedly friendly one. Despite everything that had gone before, the trainmen instructed their officials to appear before the City Council to withdraw their previous objections to the operation of cars by one man, and have since manifested a spirit of friendly co-operation toward the company.

4. One-man operation was accepted and approved by the trainmen, the city authorities and the riding public.

5. An era of friendship and trust between car riders, civic bodies and the company has replaced the old antagonism. Newspapers have ceased their attacks upon the company, and every paper, without exception, is now friendly to its interests.

6. New labor agreements were negotiated which permits the operation of the cars by one man.

7. Improvement in net income from a state of anticipated default to complete solvency. It is the belief of the present management that a surplus will result with

the return of business to normal condition.

8. Thirty per cent of all equipment was obsolete eighteen months ago. One hundred and sixty-three street cars were maintained. In eighteen months, 63 cars have been scrapped, and 50 new cars of modern design have been placed in service. Ten were purchased in late 1929. Forty more

were bought in 1930. One hundred and forty-five cars are now maintained to render 30 per cent more service.

9. In order to institute complete one-man operation, it was necessary to remodel 101 cars. This was accomplished in 100 days. Within six months, 145 one-man cars were in service.

New Franchise a Notable Achievement at San Francisco

SETTLEMENT of an extremely complicated franchise situation, in the face of what were generally conceded to be almost hopelessly adverse conditions, was the outstanding accomplishment reported by the Market Street Railway, San Francisco. The problem was originally tackled by the new management five years ago. A militantly hostile press was leading well-organized political ownership forces which had already established one of the strong city-owned street railways of the country. This same savage opposition had the public behind it sufficiently strong to have just previously defeated, by a vote of 9 to 1, an effort to turn over the privately owned lines to the city at a fair price, and was in full cry to "take the property as junk" on "a streak of rust" basis. So strongly were the city legislative officers bound by their avowed policies to "drive the private company of the city," that they could not participate in a move to settle the tangle fairly without laying themselves open to the charge of having "sold out." And they openly boasted that victory for them lay along the course of exterminating private capital from the street railway business in San Francisco.

The new management embarked upon a policy of winning its rights directly from the public, despite the hostile press, and aimed at a form of operating grant to take the place of expired and expiring franchises which would place the matter out of reach of politics. Recognizing that in the past the industry has found political settlements expensive and unstable at best, the com-

pany succeeded with the people where it could not make progress with the press and legislative officials. The company's operating permit is now a part of the city charter by vote of the people. The charter, of course, is the mandatory law governing the city's lawmakers. The charter amendment also relieves the company from certain destructive provisions which are still in the charter, but, by virtue of the new operating permit, do not apply to the company's property. While the city's right to purchase for purposes of municipal ownership and operation remain unimpaired, the new operating permit protects the company by providing that such purchase shall be at "fair value."

To achieve these ends, the fundamentals of good service—public frankness and an open-door policy to public and employees alike—constantly progressing improvements in service and equipment, were relied upon. The ideas developed on the property, and advanced practices, worked out elsewhere in the industry, were applied impartially to attain success.

The property has been well maintained and many improvements made wholly out of earnings. Speed has been materially increased and power costs cut despite some of the heaviest grades in the country and increased traffic signals. Accidents were reduced 27.7 per cent in 1930. The company's bonded debt was cut from \$12,329,000 in 1925 to \$8,857,500, a reduction of \$3,471,500. Without any demands from the men, wages were increased \$225,000 per annum.



The illuminated white fronts of the Market Street Railway cars have both merchandising and accident prevention value

Luncheon Conferences Cover

Many Important Subjects

LUNCHEON conferences, held at noon on three days during the week, were organized in four groups of three each: (1) meeting problems during the depression, (2) co-ordination, (3) service improvement and fare experiments, and (4) traffic regulation and planning.

Large and Small City Activities

Results of outstanding policies and methods adopted during the present business depression by large-city companies, by small-city companies and by interurban lines were the subjects of three luncheon conferences. The first, sponsored by J. H. Alexander, president Cleveland Railway, dealt with the problems of the large city class. Dean J. Locke, director of research United Railways & Electric Company, Baltimore, opened the discussion by showing the effect of 150 new cars on earnings, costs and speed. He stated that the new equipment has created new revenues of about \$2,000 per car per year, has reduced operating expenses and platform labor costs alone by about \$2,500 per car per year, and made possible the speeding-up of service on ten lines from 4 to 14 per cent.

C. H. Evenson, superintendent of transportation Chicago Surface Lines, told of the modified working conditions accepted recently by the platform men in Chicago, showing how this saving will amount to approximately \$600,000 per year. Mr. Alexander discussed wages and told of reductions of rate during the 1921 depression, and suggested staggered work to provide time for extra men. S. W. Greenland, vice-president and general manager St. Louis Public Service Company, pointed out the danger of forcing men to lay off one day in eight or some such similar arrangement if a change in wage agreement is to come up in the near future. He said that it would be used as a reduction in wages, and any proposed reduction would be considered an additional cut.

K. B. Thornton, general manager Montreal Tramways, discussed economies made on his property by telling how savings had been put up to each department supervisor. The result far exceeded any major move that the management could have made at the time. Results of fare change and experimental fares in Milwaukee were

given by S. B. Way, president Milwaukee Electric Railway & Light Co.

Modernization and merchandising were strongly recommended as proper steps to effect economies on the small-city property. The luncheon on this subject was sponsored by F. L. Butler, vice-president Georgia Power Company, C. W. Gifford, general manager Des Moines Railway, discussed the economy program in Des Moines which has been carried on since 1928, and told of the reorganization of departments and department employees, and of how a permanent reduction of 10 per cent in operating expenses was made. J. H. Pritchard, manager Lynchburg Traction & Light Company, told what was being done in Lynchburg, Va. to effect economies. He showed that twenty new one-man cars purchased in 1928 had permitted an increased speed of 16 per cent, and had effected a saving of about \$42,000 a year in operating expenses—enough to pay from 12 to 16 per cent return on the purchase price of the cars.

George R. Green, vice-president and general manager Northern Indiana Railway, discussed the wage reduction on his property which was made upon the request of the employees without solicitation by the management. He pointed out that his company, over a period of years, had been developing with the men a feeling of mutual confidence. The policy of letting the men know the facts resulted in the men voting 100 per cent to accept a reduction in wages as a stabilizing factor for the company and their jobs. H. H. Dartt, president and general manager Scranton Railway, urged small companies to merchandise their service. He explained his company's program of improving equipment and then advertising the better service. J. P. W. Brown, vice-president Tennessee Electric Power Company, Nashville, Tenn., outlined his company's program of economy under four heads—improved maintenance, resulting in a reduction in cost from 2.6 to 1.9 cents per mile; reduction in accidents due to a vigorous safety campaign; advertising, and efforts with other business interests in the city to maintain employment.

Co-ordination of buses with rail service and the operation of store-door freight service was discussed by Frank Karr, vice-president and general counsel Pacific Electric Railway. P. T. Reilly, manager, Delaware Electric Power

Company, told that economies were effected in Wilmington when 32 new cars were put into service, 46 old ones modernized, standardization of buses completed, one-man operation put into effect, and 15 miles of unproductive track abandoned. P. V. C. See, vice-president and general manager Akron Transportation Company, discussed reorganization and abandonment of some of his company's lines which resulted in a saving of \$5,000 per month. One garage and one car house were closed due to this change and efficiency in operation and maintenance was put directly up to department heads. F. G. Buffe, vice-president in charge of operations, gave details and figures on the new profit-sharing plan in force at Kansas City. An abstract of his talk appears elsewhere in this article.

Interurban Problems

The third luncheon, devoted to the solution of the interurban problems, was held under the sponsorship of C. H. Jones, general manager Chicago South Shore & South Bend Railroad. C. Thoburn, purchasing agent Pacific Electric Railway, described in detail the structure and operation of his company's motor freight business. He dealt particularly with rates necessary to meet competition and the advantages of using local draymen in various towns served by the freight lines. Daniel Durie, vice-president and general manager West Penn Railways, Pittsburgh, Pa., told of the service betterments made on the West Penn Lines, and the use of employees for merchandising the service and stimulating more riding. L. L. Huntoon, public relations manager Chicago, Aurora & Elgin Railroad, told of his company's employee solicitation survey, and the formation of a "Tours Bureau" to educate people in the territory to ride to Chicago.

Edward A. Keenan, passenger traffic manager Cincinnati & Lake Erie Railroad, told of a market analysis made for his company by the use of a questionnaire. These questions were answered by passengers on the de luxe trains and resulted in the management making numerous changes in operating methods. Among these changes were extended stop-over privileges for salesmen, free parking at terminals and ride stimulating fares. Dr. Thomas J. Conway, president Cincinnati & Lake Erie

Railroad discussed interurban car design. He emphasized the necessity for speed on interurban lines, and said that high-speed cars should be designed as a result of wind tunnel tests. Using power to fight the wind is throwing money away, according to Dr. Conway.

Traffic Regulation and Planning

Three of the luncheon conferences were devoted to discussion of traffic regulation and planning. The first of these, held on Tuesday under the sponsorship of E. J. McIlraith, considered signals, signs and regulations. The subject was introduced by Burton W. Marsh, city traffic engineer, Philadelphia, Pa., who spoke of recent developments in signals, particularly those actuated by the movement of the vehicle, both automotive and rail. The evils of over-signaling, particularly in the nation's capital, were brought out by E. D. Merrill, president and general manager Washington Rapid Transit Company. Advantages resulting from the use of electromagnetic signals under various conditions were outlined by Alonzo R. Williams, vice-president and general manager United Electric Railways of Providence, R. I.

Under the sponsorship of Walter A. Draper, a luncheon conference held on Tuesday considered the subject of planning new traffic facilities. Maj. J. P. Hallahan, chief engineer Detroit Rapid Transit Commission, spoke of the danger to pedestrians and users of electric railways resulting from the present trend toward increasing street widths. He referred to the possibility of requiring not only one lane, but all vehicular traffic between the street car and the curb to stop whenever the street car stopped. Another solution of the problem which he suggested was the relocation of tracks to place them nearer the curb, thus creating a roadway in the center of the street for through vehicular traffic. E. P. Goodrich, consulting engineer, New York, expressed the opinion that double-deck streets are an architectural fantasy and an economic fallacy. Experience shows, he said, that the benefits resulting from the construction of such streets are not sufficient to justify the cost. Advantages of by-pass routes were discussed by Lewis W. McIntyre, traffic engineer, Pittsburgh, Pa. Other speakers at this luncheon were William S. Canning, engineering director Keystone Automobile Club, Philadelphia, Pa., and Major Carey H. Brown, engineer director Rochester Civic Improvement Association.

Parking and garaging were the subjects of a third luncheon conference at which T. Fitzgerald, vice-president Pittsburgh Railways, acted as sponsor. Experience with no-parking regulations in Kansas City was outlined by Dan Fennell, general superintendent of transportation Kansas City Public Serv-

ice Company. He pointed out that the experiment had been tried during a period of depression, and had, therefore, been blamed by the merchants for a loss of business which more probably was attributable to general conditions. A prepared discussion by D. W. Pontius, president Pacific Electric Railway, was read by A. V. Thompson, manager transportation department General Electric Company, San Francisco. Mr. Pontius told of the gradual tightening of parking restrictions in Los Angeles, and predicted that eventually no parking would be permitted in the downtown business district. How the parking situation in Washington, D. C., has been improved lately was explained by C. Melvin Sharpe, assistant to the president Washington Railway & Electric Company. H. D. James, Westinghouse Electric & Manufacturing Company, described an automatic parking garage recently developed. His talk was illustrated by a small working model.

The Trolley Bus

That interest in the trolley bus is increasing was evidenced by the attendance of almost one hundred delegates and the intensive discussions at this luncheon, sponsored by A. B. Paterson, president New Orleans Public Service, Inc.

In presenting C. H. Evenson's paper, "What the Trolley Bus Has Meant to Chicago," W. C. Becker, Chicago Surface Lines, related the steps leading to the initial installation in Chicago, and told of the results of the vehicle in the various types of service for which it was adopted.

W. B. Brady, Central Public Service Corporation, read a paper by A. P. Lewis, Rockford Electric Company, on trolley bus operation in a city of less than 100,000 population. Although prevailing conditions made the installation an expensive one, it is estimated, on the basis of present results, that savings will bring a 20 per cent return on the excess investment over gasoline buses, without including any increase in revenue.

"Finding the Proper Place for the Trolley Bus in New Orleans" was the subject of a paper by I. O. Mall. The speaker stated that two separate studies have been made in his city for the purpose of determining the field of application of the vehicle, particularly as compared with street cars. The first deals with the vehicle itself—its principal characteristics, limitations and cost of operation, and the second with the trolley bus in relation to existing transportation facilities.

Stops at curbs, accidents, icy weather operation, life of tires, maneuverability, acceleration rates, depreciation, franchise taxes, headways, comparative costs, and sizes of the vehicle were other topics discussed extensively at the meeting.

Co-ordinating Rail and Bus Services

No longer is the bus regarded as a competitor of other local transportation agencies—it is regarded as an ally which can be used for many classes of service, and co-ordinated with the existing vehicles in use. This thought was expressed emphatically by the speakers at the bus luncheon, presided over by Adrian Hughes, Jr., superintendent of bus transportation, United Railway & Electric Company, Baltimore, Md.

Tracing the several steps leading to the adoption of the bus by electric railways, Carl W. Stocks, editor of *Bus Transportation*, stated that mass transportation operators now consider the bus as a unit to make more money. Mr. Stocks referred to the improvements made in recent years in vehicles, and stressed the importance of sound merchandising, thorough maintenance and proper operation.

E. S. Pardoe, Capital Traction Company, told of the experience with de luxe city bus lines in Washington, D. C., and discussed the accompanying problem of selecting routes, adjusting fares, selection of the most economical equipment and meeting competition from unregulated taxicabs.

The history of co-ordinating the street cars and buses of the Public Service Co-ordinated Transport, over the past eight years, was related by A. T. Warner. Stating that co-ordination means the economically proper use of each vehicle, the elimination of duplication of service and the welding of the two services in one complete whole, Mr. Warner told of the many uses made of buses in adjusting and supplementing services.

In concluding, Chairman Hughes expressed his views on the extent to which the several types of transportation units could be co-ordinated and spoke of the results in this regard in Baltimore.

The Taxicab

Although it was generally agreed that the taxicab was a desirable unit to co-ordinate with existing types of mass transportation vehicles, it was considered of first importance that electric railways co-operate with the legitimate cab companies to eliminate the cut-rate cab, and bring about legislation which would place the cab in the common carrier class, before it be adopted. This thought proved the keynote of the taxicab luncheon, sponsored by F. G. Buffe, vice-president Kansas City Public Service Company.

Naming the steady reduction in rates and the flooding of the field by car manufacturers with vehicles for cut-rate operators as the two biggest plagues of the industry, H. A. Innes Brown, editor of the *Taxi Weekly*, pointed out that

with the lower rates few companies were able to operate at a profit, and that with the number of cut-rate cabs ever increasing, the competition with both street cars and legitimate cabs was becoming nothing short of a menace. He stated that the cab should be classed as a common carrier and regulated strictly as a public utility.

Expanding on the seriousness of cut-rate competition, W. W. Cloud, president of the National Association of Taxicab Owners, stated that these cabs were educating the public down to price and not up to standard. He urged that organized mass transportation systems and legitimate cab companies unite and struggle for fair, sane, regulatory measures, that would insure stability of operation, give confidence, enable the rendering of safe, responsible service and secure an adequate financial return.

Rankin Johnson, Trenton Transit Company, related the experience of his company in the operation of taxicabs and told of the efforts to assimilate the vehicle as a part of a co-ordinated local transportation system.

Paul H. Geyser, Terminal Cab Corporation of New York, stated that the manufacturers desired legislative measures to stabilize the industry, and declared that co-operation of organized transportation companies and legitimate cab owners would benefit all concerned.

Relating the experience of his company in co-ordinating the taxicab with other vehicles, Chairman Buffe said that every effort was made to direct business to the cabs. Co-ordination, he stated, was brought about principally through regulating the operation of the cabs, combining maintenance and accounting departments, and advertising.

Fare Structures

Particularly provocative in thought was the discussion at the luncheon on fares on Thursday which was attended by more than 50 operators. Chairman Doolittle so conducted the meeting as to induce discussion, and many questions were asked intended to dispose of points about which there might be misunderstanding on differences of opinion.

Among those who participated were Messrs. Mall, New Orleans; Holden, San Antonio; Chase, Gary; Glazer, Cleveland; Boardman, Boston; Williams, Providence; Moody, Milwaukee; and Burlingham, Pittsburgh. The topics ranged from the efforts made at New Orleans to distinguish between the load factor and the use factor, through the San Antonio zone trial, the 5-cent zone experiment in Gary, the zoning experiment in Cleveland, the community fares on the Eastern Massachusetts Street Railway, the use of the pass in Providence, the selling of transportation in Milwaukee, and the interurban zone system on the West Penn, with 175 miles of route serving 25 major communities,

the largest of which is 55,000. On this system there are 80 fixed fare zones, varying in length, but averaging 2.06 miles in length.

A statement by Mr. Boardman that his company had made 311 fare reductions illustrated well the lengths to which the operators are prepared to go to sell the service. A particularly pertinent statement was his comment that sales of passes on that system varied from 4 per 1,000 of inhabitants in Lawrence to 23 per 1,000 in Fall River. The trend of opinion was that the disposition was to give the rider the breaks.

Scheduling Operation and Supervision

Lively discussion featured the lunch on scheduling. Joe R. Ong, Cincinnati, the sponsor, introduced A. J. Fink, St. Louis, who stated that the work done on his property in the last two years has resulted in an increase in speed from 8.71 to 9.62 m.p.h., measured in platform time. Time points have been eliminated, and the men have been given instructions as to how to get over the road most quickly. Unnecessary stops have been cut out. As a result, accidents have been reduced 29 per cent. One-man lines constitute about 17 per cent of the total, but give 25 per cent of the car-miles. R. A. Pierson, Los Angeles, told of similar methods being used in his city. The speed has been increased 10 per cent in two years, while the accidents have gone down 26 per cent. C. H. Evenson, Chicago, told of the need to have a real analyst to make the schedules. He believes that cars should be run on time to the fullest extent possible, and that there will be a riding response to this.

J. Metcalf, Toronto, told the results with headway recorders which were installed extensively on his property. The recorders are placed in division headquarters while there is one in the head office of the lines of the downtown districts. A total of 70 contactors were installed at a cost of \$20,000. The company also has 136 private telephone boxes from which the car operators can call to a central dispatcher. This system eliminates delays and prevents disputes. W. W. Holden, San Antonio, spoke briefly of the telephone dispatching system. He believes that in small cities where long headways are necessary, it is preferable to schedule cars on even spacing, such as 10, 15 or 20 minutes. Small cards are published giving the schedules of the long headway lines, and similar information is published on the bulletin boards. Trainmen are rated on their schedule performance which has gone up from 70 per cent of the cars on time to more than 90 per cent.

Dean J. Locke, Baltimore, said that the effect of slack schedules on the patrons is bad. On his property, the correct running time is determined by

many stop-watch observations made by riders on the cars. This record is broken down into the time for stops, delays and run. After the correct running time has been determined in this way, a car is placed on "midnight test." It is run over the route by a specially trained motorman to simulate daytime conditions. The schedules are then made out with this running time as a basis. By this method the slack time has been reduced to a minimum.

J. W. Welsh, New York, mentioned the importance of uniformity of operation by individual motormen to conform to the schedule. It is necessary to train the men intensively to do this. In obtaining such a result it is necessary to watch carefully the former history of inspectors and supervisors, according to J. L. Smith, Montreal. A man who has risen to his position from that of motorman is not likely to be careful in checking running time as is one who has been a conductor. Several other speakers agreed on this point. Alonzo R. Williams, Providence, believes that schedule making is an art, but that it is worth all of the cost.

Training the Platform Man

Ralph W. Emerson, Cleveland, introduced F. G. Buffe, Kansas City, who discussed in considerable detail the plan for compensating the trainmen adopted by the Kansas City Public Service Company. Briefly, the men get 25 per cent of the net income whether the stockholders of the road obtain any return or not. Up to the present time this payment has been made in bonds of the company so that at their market price the men obtain a return considerably greater than current interest. In the first six months \$83,000 was distributed among the employees. He said that the net result has been a decrease in accidents, in equipment failures and in delays to service, and that the net return to the stockholders has been increased materially even after deducting the amount paid the men.

Adrian Hughes, Jr., Baltimore, told of the excellent results obtained by having the local school boards give intelligence tests for rating the men. This, he said, not only simplified the work of the company but put the responsibility for the selection of the men on a civic body. A number of speakers pointed out the values of conference training and schools of various sorts for the employees. The question of payment for time spent in school was discussed at some length. It was the opinion of those present that careful use of the time paid for but not worked would make it possible to put the men in school on the company's time with little if any additional cost.

Another problem which has given considerable trouble is the training of older men. Conference training has apparently given the best results.

Brady Awards Won by

BOSTON ELEVATED and CALGARY MUNICIPAL

AFTER carefully considering and analyzing the records submitted by 118 electric railway companies entering the competition for the Anthony N. Brady Safety Award, the committee selected the Boston Elevated Railway to receive the medal in the large-city class, with honorable mention to the Department of Street Railways, Detroit. The Calgary Municipal Railway was selected to receive the medal in the small-city class, with honorable mention to the Youngstown Municipal Railway. No award was made in the interurban class.

Before proceeding to the task of determining the winners of this year, the committee had a careful study made by the statistical department of the A.E.R.A. of the whole basis of classification. This investigation confirmed the opinion, expressed in last year's report, that the scheme of classification heretofore in use was not well adapted to bringing into competition companies whose operations were fairly comparable in character. As a result an entirely new system of classification has been adopted, as well as a new method of rating the records of the companies within each class.

VEHICLE-MILE BASIS UNSATISFACTORY FOR COMPARING ALL SYSTEMS

The most obvious weakness of the old classification, which was based solely upon the number of vehicle-miles operated, was that it made no distinction between city and interurban operation. Only a moment's reflection is necessary to realize that there can be no common basis on which to compare a city system operating on congested streets with an interurban line operating wholly or partly on a private right-of-way. The committee, therefore, had no hesitation in deciding that for the purpose of awarding the medals, the companies should be divided into two main classes, city and interurban, with separate prizes to be competed for in each class.

Another less obvious but almost equally potent source of difficulty was revealed by the researches of the association's statistical department. In making these studies attention was concentrated principally upon the number of collisions, both because they are the most serious kind of accident and because they are the type of accident

that is most definitely within the control of the operators. It was known, of course, that the number of collisions tended to increase with the size of the company, but the interesting fact brought out by statistical analysis was that in city operations not only the number of collisions, but the frequency of them, increased with the population of the city served. Thus, when the companies were arranged in order according to the populations of the cities served, the number of collisions per 100,000 car-miles operated increased with the population, and when the two factors were plotted against each other, the result was a smooth curve rising quite rapidly as the population increased up to 300,000 and then rising much more slowly as the population increased beyond that point.

CITY ENTRIES JUDGED IN TWO POPULATION CLASSES

This suggested first, that, in rating the city companies, their accident records should not be compared directly with one another but in relation to their performance within their class; and second, that because of the change in the slope of the curve at 300,000 population, the group of city companies should be broken down into two classes—those serving cities of less than 300,000 population and those serving cities of more than 300,000 population.

The committee, therefore, decided to adopt this method in rating the companies. Of course, other factors such as the number of fatalities, number of personal injuries, number of boarding and alighting accidents, etc., were also taken into consideration as heretofore, but the greatest weight was attached to the records made by the contestants with respect to collisions.

The decision to make no award in the interurban class was due to the fact that the data received from this group were not sufficiently detailed to permit an equitable decision. This is due to the peculiar conditions under which they operate, which make it necessary, in order to compare them, to secure data in a great deal more detail than most of them are able to furnish from their ordinary records. Some interurbans operate entirely on private rights-of-way; others operate entirely on public streets and highways; and still others operate partly on private

rights-of-way and partly on public streets, the proportions varying among different companies. Some interurbans operate in and through large cities, while others operate only through relatively small towns and villages. Obviously, in order to compare such companies it is necessary to know the amount of service on private right-of-way and the amount on public streets and highways. It is also necessary to know the number and populations of the cities and towns through which a road operates, and the proportion of its service given in each town. All of these data were requested from the companies, but none was able to give complete information. The largest and most representative interurban companies did not even attempt to give it. It was, therefore, impossible to determine what company was entitled to the award.

FURTHER INTERURBAN STUDY NEEDED

Without these data, it is impossible to compare the companies. Even with such data in hand, the committee doubts whether the results arrived at would be entirely equitable. It recommends strongly that before another prize contest is inaugurated an intensive study of the whole question be made, preferably with the assistance of experienced interurban operators.

Canadian Meeting Well Attended

CANADIANS present at the convention held an informal meeting on Wednesday morning, Sept. 30. K. B. Thornton, Montreal, president of the Canadian Electric Railway Association, presided. A number of matters were discussed in a general way. On behalf of the Toronto Transportation Commission, D. W. Harvey, general manager, stated that an invitation had been given to the American Electric Railway Association to hold its convention next year in Toronto. There was some discussion as to the time and place for the Canadian Electric Railway Association's annual meeting next year, Mr. Harvey also extending an invitation to that body to meet in Toronto either at the same time as the American Association or at the regular time for the Canadian meeting. Attention was called to the work of the headquarters staff of the Canadian Association, which has met with good response from the membership. A number of compilations have been prepared, and are available for the covering features of railway operation on Canadian roads.

Following the general meeting there was a meeting of the Executive Committee of the Canadian Electric Railway Association. Mostly routine business was transacted.

RESEARCH Is Theme of

Engineering Sessions

PRESIDENT L. D. BALE, in his address to the Engineering Association, sounded the keynote of "Research" as expressing the work of the association during the year, and as being an absolute necessity in the solution of many of the major problems of the industry. As proof, he mentioned: first, the conduct of a thorough investigation of electric railway cars in order that progressive improvements may be made; second, scientific research involving the field of economics found in the work on fare structures by the American Association, and third, the work of the Committee on Economics of Rolling Stock Application. This last committee is making an extensive study to determine the relative advantages of the several types of rolling stock—rail car, trolley bus and motor bus—under any given set of conditions, so that the industry will be supplied with knowledge leading to a definite decision relative to the desirability or feasibility of making extensions to existing lines or substituting one form of vehicle for another, or of the abandonment in part or in whole of an existing route.

"In this highly competitive age," continued Mr. Bale, "the individual can no longer be guided largely by his own views and opinions. More than ever we need to act collectively, to base our judgment and our decisions on the results of scientific analysis of all the available facts. Here is where this association can be of maximum service. It has the machinery, and is in an excellent position to conduct scientific research."

Frank R. Phillips, in a paper read in his absence by Thomas Fitzgerald, stressed the importance of the engineer in all projects for modernization of transportation service, particularly with competitive conditions of today, and the need of developing executives from the ranks of the engineers. A lively discussion followed, and several speakers pointed out methods for improvement and economies.

Reporting for the Committee on Economics of Rolling Stock Application, James W. Welsh, New York, pointed out that it is not possible to determine the place of the several vehicles available by means of a mathematical formula. So-called constants fluctuate with



L. D. Bale
President

the amount of service given, and political and financial ramifications also must be taken into account. In the discussion, H. C. Patton brought up some of the problems involved in determining revenues and expenses of individual routes.

L. C. Winship presented the report of the Committee on Heavy Electric Traction. In the discussion, H. F. Brown, New Haven, pointed out that the steam railroads are facing the same problem as the electric railways in shrinkage of passenger revenues due to highway competition. Perhaps highways should be taxed so as to make them self-supporting, he said, rather than to charge the cost to the taxpayers, including the railway systems. Electrification is today cheaper than at any time in a generation, according to Mr. Brown, due to low labor and material costs. If the railways can be sure of the business, they will proceed with many installations.

Martin Schreiber related the experience of the Public Service Co-ordinated Transport with a Diesel-electric bus. He was hopeful that the development of this type of drive will be of great value in transportation work. Discussing this paper, Col. G. A. Green pointed out some of the problems connected with the Diesel engine, and believed that a great deal of work will have to be done

before all the fundamental problems are solved.

Award of the ELECTRIC RAILWAY JOURNAL maintenance prize to the Georgia Power Company, Atlanta division, was made by W. W. Wysor, chairman of the committee of judges. This year the award was based on data showing the general character, quality and cost of the maintenance work done by the various companies in the industry during the year. Honorable mention was given to the Department of Street Railways, Detroit; Memphis Street Railway; New Orleans Public Service, Inc., and Virginia Electric & Power Company.

Mr. Wysor presented the report of the Committee on Nominations, the following ticket then being elected for the ensuing year:

President—Charles H. Jones, general manager Chicago, South Shore & South Bend Railroad, Michigan City, Ind.

First Vice-President—P. V. C. See, vice-president and general manager Akron Transportation Company, Akron, Ohio.

Second Vice-President—E. M. T. Ryder, way engineer Third Avenue Railway System, New York, N. Y.

Third Vice-President—Howard H. George, superintendent of way Cleveland Railway, Cleveland, Ohio.

Executive Committee—Officers and L. D. Bale, junior past-president, A. T. Clark, W. E. Bryan, J. Fleming and C. A. Smith.

Following the election, the new officers were installed and the past-president's badge was presented to Mr. Bale by the incoming executive, Mr. Jones.

Separate sessions of the four divisions of the Engineering Association, power, purchases and stores, rolling stock, and way and structures were held on Tuesday and Wednesday afternoons. Each was presided over by the chairman of the division, who outlined the results of committee work during the year, and received the reports of the various groups. A brief résumé of the sessions follows:

Power Division

Sessions of the Power Division were held on Tuesday and Wednesday with Dwight L. Smith, chairman of the Standing Committee on Power, presid-

ing. Reports of the several committees were received.

Considerable discussion developed on the subject of mercury power rectifiers, following the presentation of a paper by H. W. Codding, Newark, N. J., giving the present status of the device for railway service. D. C. West, Westinghouse Electric & Manufacturing Company, held that it will be necessary to develop a rectifier which can supersede the rotary converter for all purposes. He believes that greater reliability and higher efficiency will be reached within the near future. On the subject of interruptions, Mr. Codding stated that the more recent rectifiers have bettered performance records. All rectifiers that are being made will carry overloads according to the standard guarantee for conversion equipment.

Another subject of interest was trolley bus overhead construction. A. J. Klatte, Chicago, showed lantern slides and movies illustrating the method of erecting the overhead line in Chicago for the recent trolley bus installation. In the discussion, L. W. Birch, Ohio Brass Company, pointed out that tests show the negative trolley shoe wears three times as fast as the positive shoe. The reverse is true of trolley wires, the positive wire wearing twice as fast as the negative. In response to a question, Mr. Klatte stated that with shoes it has been possible to reduce the trolley pole pressure to about 22-24 lb. per shoe.

Results of the collection of information on trolley wire wear were given by H. S. Murphy, Philadelphia. Information which his committee has been gathering for a number of years was presented in a detailed report.

Effects of street railway equipment and service characteristics on energy consumption was the subject of a paper by T. F. Perkins and R. H. Sjoberg, of the General Electric Company, read by Mr. Perkins. Influence of a number of variables was pointed out. Increasing the rate of acceleration requires a larger power peak, but the energy consumption for a given run decreases slightly. Raising the free-running speed by changing gear ratios requires a greater current and also more energy. Reducing the time of coasting calls for more energy with a very slight gain in schedule speed. Increasing the rate of braking results in a faster schedule with some increase in energy. Reducing the time of stop gives an appreciable increase in schedule speed with no effect on the energy. Reducing the number of stops increases the schedule speed materially with lower energy consumption. Reduction in car weight is reflected directly in lower power demand and energy. The authors held that no practicable general analysis of the problem is universally applicable and each particular

change in equipment must be considered by itself. A number of delegates discussed the paper, bringing out the effect of the service variables. Morris Buck, New York, pointed out that the changes discussed could be placed in two groups; one representing possibilities with no modification of equipment, while the other required either new equipment or physical changes that could be made only at considerable expense. In the former class, the advantages can be obtained only by the co-operation of the transportation department through teaching the operators to run their cars more economically.



Trophy Awarded to Georgia Power Company in Journal Maintenance Contest

Spacing of substations for 600-volt d.c. railways was the subject of a paper by E. A. Imhoff, Chicago, read by J. F. Neild. A number of charts showed the effects of the various elements. They indicated that a combination of high substation cost with low feeder cost will dictate the greatest spacing of substations, while a combination of low substation cost with high feeder cost will give least spacing.

Purchases and Stores Division

Standardization of methods was the chief topic of discussion at the two sessions of the Purchases and Stores Division on Tuesday and Wednesday afternoons with C. A. Harris, Philadelphia Company, presiding as chairman. After a brief presentation of the standing committee report by the chairman the reports of the several committees were read and discussed.

A paper on standard packaging for electric railways by A. E. Hatton, superintendent of materials West Penn Railways, was read by J. Fleming, purchasing agent Capital Traction Company. Edwin W. Ely, of the Bureau of Standards, gave a formal discussion of Mr. Hatton's paper which evoked many comments from those present.

"Handling Bus Materials From the User's and the Vendor's Viewpoint" was then presented by W. E. Scott, superintendent of supplies Philadelphia Rapid Transit Company. Mr. Harris led a lengthy discussion on this topic.

Rolling Stock Division

Following the reading of the standing committee report by chairman Thomas H. Nicholl, superintendent buildings and equipment Cleveland Railway, the first session of the Rolling Stock Division featured two papers: "Brake Lining Development and Brake Tests," by F. C. Stanley, chief engineer Raybestos division of Raybestos-Manhattan, Inc., and "Experience in Trolley Bus Operation," by W. C. Wheeler, engineer of equipment Chicago Surface Lines. Mr. Stanley's paper pointed out the fundamental principles controlling the design of braking mechanisms and the selection of brake lining material. Maximum speed of vehicle, rate of retardation and frequency of brake applications were enumerated as the important factors in the temperature rise of brake drums. Mr. Stanley also described various forms of brake tests used by his company. Mr. Wheeler's paper, abstracted elsewhere, evoked questions from J. H. Walsh, superintendent of bus maintenance Middlesex & Boston Street Railway, and from P. V. C. Sec, general manager Akron Transportation Company.

"Aluminum—Its Uses and Past Experience in Car Construction" was the subject of a paper by A. H. Woollen, engineer Aluminum Company of America, at the second session. Several cars that have been built with aluminum alloys were illustrated. In designing a car of aluminum alloys, said Mr. Woollen, the first consideration should be that of deflection. In general, if the deflection of the car frame members is kept within satisfactory amounts, the stresses in the various parts will rarely exceed 5,000 lb. per sq.in., although 12,000 lb. per sq.in. under impact and 15,000 lb. per sq.in. under static loading is entirely safe.

The designer can keep down costs by employing shapes, sheet, castings, forgings and other standard aluminum products to the fullest extent and by watching the radii of bends. The extrusion process for producing aluminum offers a means of avoiding much shop cost in the making of joints and bends in such parts as belt rails, window sills, side posts and anti-climbers. Where necessary, however, hot bending or forming of the aluminum alloys can be done.

Welding of aluminum by the oxy-acetylene or oxy-hydrogen method and electric arc welding by metallic or carbon arc electrode are practical. However, aluminum welds are castings and there is an appreciable decrease in strength. The welding of side posts to

belt rails also should be avoided, he said.

The remainder of this session was devoted to the presentation of eleven committee reports. Each of these reports was discussed at some length.

Way and Structures Division

Cost of track construction was the principal theme of discussion at the Tuesday afternoon session of the Way and Structures Division. A paper describing certain work done in Washington was read by E. P. Goucher, engineer of way and structures Capital Traction Company. Howard H. George, superintendent of way Cleveland Railway, in a prepared discussion of Mr. Goucher's paper, gave interesting data on the cost of track construction on his property. He placed special emphasis on the importance of vibration of the track structure as a means of insuring a good bond with the concrete.

The adoption of a few standard de-

signs of track was recommended by John B. Tinnon, sales manager Metal & Thermit Corporation, in a paper presented at the Wednesday session. He expressed the opinion also that the average way engineer is not sufficiently familiar with the designs and methods used on properties other than his own. The problem of economical track construction is not the problem of the management, the holding company or the banker, he said, but it is the problem of the way engineer. In conclusion, he urged that way engineers interest themselves more keenly in the problems connected with selling electric railway transportation to the public.

The report of the Standing Committee on Way and Structures was presented by C. A. Smith, chairman, at the Tuesday session. Reports of various committees were presented in summarized form. Abstracts of these reports appear elsewhere.



E. P. Goucher

tion for the new track. Due to a slight raise in the grade of the new track, we were able to leave in some of this material under the new ties and directly below the wheel rails. As there was an existing 6-in. porous tile subsoil drain between the tracks, no other drainage was installed on the new work.

The new track was carried on old scoria brick and small wedges, and held to line by means of blocks and wedges between the rails and the roadway and dummy concrete. As far as possible, the concrete was poured from the trucks directly into the track space. It was tamped under the ties with an International tamping machine, followed by an experimental vibrating machine sent us by the tie manufacturer. This machine consisted of two air-operated tie tampers mounted on a piece of 7 in. channel iron. Although crude, in some respects it was superior to the newer models, its main drawback being the noise. The only finishing necessary after the passage of the vibrating machine—and this is where grooved girder rail proves its worth—was the dragging of a short length of $\frac{3}{4}$ -in. hose over the concrete.

We think that the method we are now using is as satisfactory, from an economical and practical standpoint, as is possible at the present time for rigid track in paved streets. We are not entirely satisfied, however, that the noise cannot be considerably reduced. There is no question but that all solidly concreted tracks are too noisy. Noise is one evil on which we are going to have to spend considerable thought and energy if we expect to continue street car operation. Probably a bituminous surface would be beneficial, although slightly increasing the cost, and we expect to experiment along that line on our next reconstruction job.

Construction costs on this track compared favorably with our past experience with surface track laid with 100-lb. T-rail on treated ties, and concrete to the top of the rails. In the table are given the unit prices paid for labor and concrete materials, and the labor-hours expended on the work, stated as dollars per lineal foot.

A Typical Urban Track Construction

By

E. P. GOUCHER

Engineer of Way and Structures
Capital Traction Company
Washington, D. C.

OUR present standard type of surface track construction consists of A.E.R.E.A. 7-in., 103-lb. girder grooved rail, with Thermit weld joints, installed on International bent steel twin ties, on 6-ft. centers, with solid concrete pavement to the top of the rails. The twin ties which we use are so formed or bent as to provide an arched effect from rail to rail, and at the same time reduce the amount of excavation and concrete necessary for the construction by about 295 cu.yd. per mile of single track. They are punched for the standard type forged-steel clip and tee-head

bolt as furnished by the tie manufacturer. We use truck mixed concrete of a 1-2-3 $\frac{1}{2}$ mix, furnished by a local contractor. The trucks are of 3-cu.yd. capacity, and the water is added and the material mixed for five minutes after arrival at the job, under the supervision of the concrete foreman.

The old track was jacked out of the street, and necessary excavation and grading were done with pneumatic tools. Full sized wood templates of the finished excavation enabled us to trim very closely to line. The old ballast was very compact, and made an excellent founda-

Labor and Material Costs per Foot of Track

	Costs				Labor Hours
	Labor	Hauling	Material	Total	
Engineering.....	\$0.177	.....	.....	\$0.177	0.101
Excavating and removing old track.....	0.636	.....	.....	0.636	1.400
Disposal—excavated material*.....	0.158	0.133	.....	0.291	0.377
Installing steel ties.....	0.086	0.008	1.299	1.393	0.182
Installing wheel rail.....	0.072	.....	1.607	1.739	0.138
Thermit welding joints.....	0.113	0.001	0.194	0.308	0.210
Surfacing and lining.....	0.211	0.002	.....	0.213	0.424
Concreting†.....	0.420	0.004	2.667	3.091	0.982
Watchmen and lampmen.....	0.337	.....	.....	0.337	1.279
Sundry labor and material, including tools, etc. ‡.....	0.145	0.062	0.218	0.425	0.315
Portable crossovers, including signals and switchmen	0.357	0.008	.....	0.365	0.850
Gross total.....	\$2.712	\$0.218	\$6.045	\$8.975	6.258
Scrap credit, including bandling.....	0.011	0.014	(0.655)	(0.630)	0.027
Net total cost.....	\$2.723	\$0.232	\$5.390	\$8.345	6.285

*Average haul about $1\frac{1}{2}$ miles.

†Including burlap, labor sprinkling, etc.

‡No tool or equipment rental charged.

Experience in Trolley Bus Operation

By

W. C. WHEELER

Engineer of Equipment
Chicago Surface Lines

OUR early experience in trolley bus operation led to a number of suggestions for mechanical and electrical improvements in each subsequent lot purchased. The original buses were equipped with swiveling trolley wheels. The weight of the harp and wheel was approximately 12.25 lb., and with the 18-ft. pole it did not function satisfactorily. Due to the inertia of the dead weight, excessive tension was required to hold the wheels in contact with the wire, and it was found also that when one pole would come off it would whip enough to dewire the other. Springs were added to increase pole tension, but they had no effect on the tendency of the pole to whip when dewired. The inertia of the weight at the end of the pole was also detrimental in that under high wind pressure or rates of acceleration the pole would be pulled away from wire contact. Mine type wheels and harps tried were lighter in weight than the original ones, but did not help sufficiently to offset higher maintenance charges. With the development, however, of the swivel type shoe, conditions have been materially improved. The new assembly weighs approximately 5.25 lb., only slightly more than 40 per cent of the original. This has made possible a reduction of the shoe pressure on the wire, removal of the extra springs that were installed, and practically eliminated any tendency to whip or cause dewirement of the other pole.

Another source of annoyance was brakes, coupled with a decided steering wheel vibration on certain buses at the time of brake application. This was corrected by the substitution of a plain type of thrust bearing in the bottom part of the steering knuckle in place of the roller bearing that was furnished as original equipment. The brakes on trolley buses have the handicap of poor ventilation and the possibility of oil leakage from wheel and transmission bearings. As summer temperatures are encountered, together with conduction of heat from the brakes of the wheels, the grease becomes so thin in severe service that oil seals must be kept in practically perfect condition if the buses are to maintain braking ability. Another factor in brake troubles is the wide variation in brake pedal travel and pressure. Our efforts to standardize or make uniform the application of the brakes lead us to believe that a total travel of 5 in. with an effective travel another. The A.E.R.E.A. manual con-



W. C. Wheeler

of approximately 4 in., all of the lost motion being at the "off" position to insure release, and pressures between 18 lb. minimum and 40 lb. maximum, will be the most desirable. A short pedal travel does not permit of quick and accurate determination of braking pressures. If the spring pressure is too weak, it will create a tendency for the operator to fan the air on rough pavement, due to insufficient support of the foot; while a pressure that is too high will tire an operator in all-day service.

The brakeshoes are now giving a satisfactory life after an early period of trouble with chatter, screech and rapid wear. Properly fitting shoes and ventilated rims and wheels are necessary in severe service if shoe life is maintained.

Proper selection of tire sizes has an important bearing not only on the tire life but on other factors, such as step heights and brake drum ventilation. Load distribution on wheels affects the braking effort available at each wheel. The heat from braking in severe service requires adequate ventilation of the drums and wheels, as overheated brake drums will cause rapid wear on brakeshoes, and also affect the oil seals and their effectiveness. Better results have been obtained where tire sizes are such that these conditions can be met, and the tire loads are kept within the tire manufacturers' rating of capacity. Brake testing equipment has reduced trouble.

In making provision for trolley bus maintenance we have followed standard electric railway practices, and the men have been carefully selected from regular carhouse maintenance forces. Motors, control, heaters, and a great amount of the air brake equipment are comparable with railway parts and the maintenance of this equipment is carried on along the same lines. The differences in braking and gear equipment are quickly learned, and the care of tires and steering mechanism are the only new parts to be maintained. We believe that this careful selection of street car maintenance men for servicing trolley buses has been a valuable aid in securing our high standard of maintenance and operation.

Bus Materials

Present New Problems to Storekeeper

By

W. E. SCOTT

Superintendent of Supplies
Philadelphia Rapid Transit Company

WHETHER in steam, electric car or bus operation, the old ABC of the stores department still exists—serve the operator, keep the line running, but don't forget the investment. Regular demands must be protected and emergency parts stocked. Minimums do not put gaskets on the engine. Certainly a control feature must be established, but I would hesitate to express an opinion for one method over another. The A.E.R.E.A. manual con-

tains an adopted plan of stock control which many operators indorse. Its scope includes:

1. Subdivision of material into classes, each containing material of a similar nature.
2. Actual review of each item by physical count at least once each month.
3. Actual review of consignments contracted for.
4. Summary of stock on hand and material on order and the preparation of

requisitions for purchase of future requirements at least once each month.

5. Compiling of statistics by classes from the dollar and cents view to determine the efficiency of operation.

Physical handling of bus materials is generally divided into four groups, as follows, each of which has its peculiar problems:

- (1) Gas and oil.
- (2) Tires.
- (3) Units.
- (4) Repair parts.

In Group No. 1 the railway storekeeper forsakes his former problems of solid storage, such as rail, ties, wheels, etc., and enters a field of liquid storage and transfer. Each operator attacks his problems in a manner best suited to conditions. Some operators have found it economical to erect a large bulk storage plant with a capacity to handle steamer tank loads. Other operators locate their bulk storage at garage points adjacent to railroad sidings, or procure gas from contractors in bulk lots.

Oil is usually contracted for delivery as required to garages and service stations. Some stores organizations maintain oil reclamation plants where the used product is thoroughly cleansed and brought back to its original state.

For many railways, tires are not a problem for the storekeeper, inasmuch as tires are being mounted by the contractor and used on a mileage basis; the problem of storage being theirs together with the mounting. But for those operators who are faced with storage of their own rubber, it is essential that all precautions are taken to insure against aged rubber, and that the stock of rubber is intelligently measured by the turnover.

Storage facilities for the ease of handling the units in Group No. 3 should be provided. Special skid platforms for ease of movement throughout the shop to storage house have been prepared for this material. These platforms are also provided with special arrangements for lifting chains to avoid damage to the unit.

In Group No. 4, standard storeroom arrangements such as bins, cases, racks, etc., should be provided. Wood and steel cases are in general use. However the daylight steel cases are found to be more generally used and certainly afford a saving in space, better light, lower costs, tend towards better house-keeping and permit a more accurate count of stock. Above all else, the proper identification of material stored must be made.

The vendor has his problems which, in a general way are ours all over again. He provides a system of control based on sales. He cannot afford to tie up a lot of dollars in inactive material, and his turnover must also be consistent with his investment. I now give you the vendors' views from two sources. One vendor states: "My

company does not believe that material problems are yours; we think that they rightfully belong to us. Your material requirements should be handled by one of our service departments and go from our shelves to your buses. Our outfit is large and there are maintained throughout the states close to 100 service stations where we are always ready to serve your parts requirements."

The other vendor stated that his com-

pany maintained five service parts depots placed at strategic points in the country and serviced with parts by the general depot located at the factory. Each of these depots maintained a 24-hour service for customers' use. His recommendations with regard to material was that supply departments of the bus operators maintain their own storerooms and that material be ordered through these five general depots.

Diesel Engines in Transportation

By

MARTIN SCHREIBER

General Manager in Charge of Plant
Public Service Co-ordinated Transport
Newark, N. J.



Martin Schreiber

EUROPE up to this time has been the leader in Diesel engine work, because of a large differential between the cost of gasoline and fuel oil. The Diesel engine was invented and developed in Germany. Up to date, there are substantially 3,500 Diesel buses and trucks actually in operation in Austria, England, France, Germany and Switzerland. Capitol District Traction Company, Albany, N. Y., has operated a Mack bus equipped with a 6-cylinder Mercedes-Benz Diesel engine and General Electric propulsion units for a period of eight months. This bus has run about 24,000 miles. The fuel mileage is 5.22 miles per gallon as compared to a gasoline-electric unit that has a fuel mileage of 2.78 miles per gallon.

The Diesel engine experience of Public Service Co-ordinated Transport, Newark, N. J., covers approximately two years. One bus is in regular operation. It fits in with a schedule with gasoline buses on one of its city lines. This bus is a Yellow Coach Z-240, equipped with a Mercedes-Benz Diesel 6-cylinder engine with electric drive. The fuel consumption is about 5.50 miles per gallon, as against 3 miles for the

gas-electric buses. This superior fuel economy of the Diesel engine, together with the fact that the entire ignition system is eliminated, makes it particularly attractive to fleet operators. The engine and accessories are actually simpler than the gasoline assembly.

Mercedes-Benz Diesel engines, with which Public Service Co-ordinated Transport has experimented, are of the indirect injection or pre-combustion chamber type. The fuel pump and injection nozzles are standard Robert Bosch products. The engine is started readily, even if cold, and the bus can be driven almost immediately—no long warming-up period is necessary. Road performance is equal to that of gasoline buses of the same power, and the exhaust is practically colorless and odorless. These engines have been operated by numerous drivers and maintained by several garages, demonstrating that extraordinary care or skill in operation or maintenance is not required.

An important advantage of the use of Diesel engines is the elimination of the fire hazard in motor coaches, as well as in the storage, handling and transportation of the fuel. Another advantage is the elimination of the ignition system and carburetor, which would materially reduce the number of service interruptions. Failure of the fuel supply due to vapor lock, which is experienced in some gasoline vehicles during hot weather, would, of course, be eliminated by the use of fuel oil. Experience demonstrates cooling water and exhaust temperatures are noticeably lower than in gasoline engines.

Operating experience appears to justify an intensive development that should soon produce satisfactory engines. A considerable attitude on the part of fleet operators and their substantial encouragement, amounting to a demand, will greatly hasten domestic Diesel development.

Engineering Committees Show Results of RESEARCH WORK

Heavy Electric Traction

Six subjects were handled during the year by the Committee on Heavy Electric Traction. On the review of the existing Manual sections, it was recommended that the sections on clearance between contact conductors and permanent way structure be withdrawn pending joint action with the American Railway Association's Electrical Section. Several conflicts in the Manual section on 600-volt direct-current trolley construction were found, and it was recommended that these conflicts be referred to the Power Committee. It also was recommended that due consideration be given to clearance of conductors associated with the overhead electric contact systems in any new clearance specifications.

The study of track and third rail bonds for heavy traction work was continued, and it was recommended that the specifications for stud terminal bonds be revised as suggested in the report. It also was recommended that the methods of joining third rails by other than bonding and methods of applying welded bonds be studied further.

A complete tabulation of oil-electric locomotive operating statistics for 1929-30 was presented by the subcommittee on this subject. The study of train operation, particularly articulated units, was continued, and additional information was given. Data on additional locomotives which have become available since the last report were published, including the motive power for several of the latest electrifications.

Power Division

1. *Manual Review*—Stranded copper wire tables comprising bare concentric soft-drawn copper; bare concentric hard-drawn copper, A.S.T.M. Class A stranding; bare concentric hard-drawn copper, A.S.T.M. Class B stranding; bare concentric hard-drawn copper, A.S.T.M. Class C stranding; and bare concentric hard-drawn copper, extra flexible stranding, were prepared and presented as recommended standards. Work was started on revision of the section on paper-insulated cables. The Manual section on the joint use of wood poles was revised in detail, and was presented for approval as a supplement.

2. *Mercury Power Rectifiers*—This represents the sixth year of study on the subject by this committee. Sum-



Chairmen of Divisions, Engineering Association

- 1—Thomas H. Nicholl, Rolling Stock Division
2—Dwight L. Smith, Power Division
3—C. A. Harris, Purchases and Stores Division
4—C. A. Smith, Way and Structures Division

maries of operating results for the calendar year 1930 are included in tabular form. Another table gives the record of the rectifier units installed or on order in America. The bibliography also was brought up to date.

5. *Catenary Specifications*—A study was made of new types of messenger for catenary construction. A tabulation was given of catenary systems of a considerable number of electrified steam railroads and heavy interurban lines. It was recommended that this study be continued. The study of insulators during the year resulted in the development of several designs for pin type and suspension type insulators for voltages from 0 to 1,500, 1,500 to 3,000, 3,000 to 11,000 and 11,000 to 22,000. It was recommended that this subject be continued. A classification was presented of the various types of supporting structures for catenary lines.

6. *Trolley Wire Wear*—Detailed statistical information relative to trolley breaks was included, bringing the subject up to date through 1930. For the first time, the tables include data on kilowatt-hours and wire used for replacements. A study of the practical and economical sizes and types of trolley support ears for general use was begun. The study of larger sizes of grooved trolley wire was continued, and a proposed revised specification was presented. An attempt was made to determine a fair method of comparing line maintenance performance as an aid to reducing trolley breaks. It was recom-

mended that this subject be continued as the work is considered only a preliminary step that is based on incomplete data.

7. *Trolley Construction Specifications*—This committee presented a revised specification, which was prepared to conform with the latest edition of the electrical safety code, and incorporating the recommendations of former committees. Wherever possible, revisions were made to conform with similar items in the specifications for catenary overhead construction. These revised specifications are stated to be complete and modern, and are satisfactory for adoption. It was recommended that the existing Manual Section D 101-16 be discontinued.

8. *Trolley Wire Reels*—A design for a larger-size reel was prepared for inclusion in the present standards to provide for the new large-size trolley wire recently adopted. There is a tabulation of the capacity of the reels for various sizes of trolley wire. It was recommended that the attention of the users of trolley wire reels be drawn to the fact that more consideration should be given to specifying the use of standard reels.

9. *Trolley Bus Overhead Construction*—Changes were recommended in the existing Manual Section D 106-25, the drawings to be rearranged and additional ones to be inserted, and changes made in several subdivisions. These changes were submitted as an appendix.

10. *Lightning Protection*—After reviewing the reports of last year's committee on this subject, and in consideration of the fact that definite information regarding the effect of lightning on all overhead power circuits is not available, the committee did not believe it was in a position to revise the Manual section on lightning protection at this time. As an appendix, a brief review of information collected in the past two years was given.

12. *Ferrous and Non-ferrous Materials*—The year's report covered briefly the work being done by the Electrical Section, A.R.A., the American Society for Testing Materials, and the American Foundrymen's Association. A bibliography also was given of specifications for coating ferrous materials to prevent corrosion.

13. *Trolley Voltage Surveys*—The question of proper trolley voltage for congested urban distribution was continued. Results of tests made in Cin-

cincinnati and in Pittsburgh with reduced voltage in the congested districts were presented. First conclusions show that it is possible to make a considerable saving in power on the basis of the Pittsburgh test. This seemed to be greatest at the lowest practical operating voltage, i.e., 450 volts. At Chicago on the Surface Lines in sufficiently congested areas it appeared possible to reduce trolley voltage without reducing the speed of the cars, and, at the same time, to derive benefit from reduced peak demand. On the Chicago Rapid Transit Lines a substantial saving in power was possible with reduced voltage, but at the expense of speed. In Montreal a considerable saving in energy consumed with a reduction in demand by the use of reduced voltage was possible. In Cincinnati the test demonstrated that a reduction of voltage in the congested areas would cut power costs but little, and can be accomplished only by sacrificing speed in the congested areas. The committee concluded that additional properties should make studies of reduced voltage. It held that reduction of trolley voltage is in some cases not feasible, due to the same substation feeding both congested areas where maximum speed cannot be obtained and other areas where maximum speed can be obtained. It also held that a feasible scheme of providing constant illumination could be provided, and that any reduction in trolley voltage in the congested areas should be used in service only in the event that economies can be realized without reducing car speeds, or without interfering with the operation of cars and associated auxiliaries.

Purchases and Stores Division

1. Manual Review—It was decided that the recommended stock book system of controlling materials and supplies appearing in the Manual should be reviewed with the idea of bringing it up to date. Accordingly, it was assigned to Committee No. 6 for study. Progress has been made in the preparation of an index for the A.E.R.A. classification of materials and supplies.

2. Unit Piling and Standard Packages—Twenty items were agreed upon for standard packages of material peculiar to electric railways, which are the major users of this class of material. General agreement of railway companies was obtained, and, after a poll of the Executive Committee, the recommendations were referred to the Division of Simplified Practice. After a few minor changes, quantities for the twenty items were agreed upon. The Navy Department and 56 manufacturers and users have accepted the recommendations. The committee is continuing its study of quantities for standard packages for other items common to electric railways.

3. Stores Investment and Costs—A questionnaire was sent to various elec-

tric railway companies asking for data on investment in material or supplies for the year 1929. Detailed information on the basis of this questionnaire is included. It was shown that there is an average of 17.41 per cent turnover, or that portion of the stock which is moved monthly in relation to the stock on hand. This is equivalent to an annual turnover of 2.09 times. The per cent turnover figures show clearly that companies

forms and obtaining them, co-operation with government standards of typified forms, regulation of deliveries and centralized control. It was brought out that several large companies were able to reduce the number of printed forms by about half after a study had been made and outlined in a questionnaire sent to the members. The report was submitted as one of progress only, and it was recommended that the work be continued.

Rolling Stock Division

2. Motor Coaches—The uniform motor bus specification code was recommended for approval. Progress was reported on the study of a number of subjects, including standard sizes of destination signs and window glass, static testing of bus bodies and chassis, maintenance schedules, necessity for definite oil specifications, chassis lubrication, recent improvements in the manufacture of gear lubricants, and the use of fuel oil for Diesel engines. Information was compiled on mileage run by various companies between chassis lubrication. An extensive survey proved that great improvements had been made in brakes and brake drum material. Disposal of exhaust gases, ventilating and heating were covered in a questionnaire, and tabulated as an appendix.

3. Car Design—Tendencies in car design indicate a continuation of greater use of the possibility to improve the appearance of cars. This is shown in lower body floor and roof construction, and in streamline painting effects. Wider windows or post spacings of 36½ to 40 in., as compared to those used in the past of 29½ in., have also been used to emphasize the long, low appearance of the car. Reference was also made to the installation of groups of cars equipped with trucks and motors of the new high-speed light-weight types. Extensive tests were conducted during the year on the Chicago Surface Lines on a number of equipments, including the later type high-speed motors and trucks. A summary of the results obtained is included in an appendix. Another appendix gives power losses in electric street car reduction gears. The report also referred to the work of the Presidents' Conference Committee.

4. Lighting—This committee continued its study during the past year on headlighting for electric railway cars. A complete proposed revision of Manual Section D 121-30 on car lighting was presented in an appendix. The principal revisions include recommendations of the use of dash illuminating headlights, recommendations for rapid transit car lighting, a method for computing illumination for various types of cars, together with other essential data. Further investigation was made on the use of 32-cp. lamps for interior illumination of motor coaches. The information gathered was presented in detail in an



Chairmen of Engineering Association Committees

- 1—L. C. Winship, Heavy Electric Traction
- 2—E. P. Goucher, Co-operation with U. S. Department of Commerce
- 3—James W. Welsh, Economics of Rolling Stock Application
- 4—Chas. Rufus Harte, Historical Review of Engineering Association's Organization and Growth
- 5—W. W. Wysor, Electric Railway Journal Maintenance Contest, Necrology, Nominations, Program
- 6—E. M. T. Ryder, Welded Rail Joints, Editing of Proceedings
Chas. H. Jones, Engineering Manual, Subjects

operating buses only have a much higher rate of turnover than those operating railways only, or both railways and buses. The committee recommends to member companies that individual studies be made of investment in material and supplies with a view of securing the highest possible turnover.

6. Material and Supplies Control—This committee presented a report of progress only, giving answers to a questionnaire on the subject of stock control, as received from 42 companies.

7. Handling of Bus Materials—The report consisted of a discussion of methods of stock control, methods of identification, methods of storing, methods of procurement on supplementary order contracts, regular purchase orders, emergency purchases, and the coordination with the manufacturers for proper tagging and marking. It was recommended that the subject be continued, and that detailed data be included in future reports on several of the sections. A number of other features concerning handling of bus materials were suggested as subjects for the committee to investigate.

8. Handling of Stationery and Printed Forms—The subject was considered largely from the view of physical control of stationery, methods of preparing

appendix. Another table was presented showing the demand for the twelve-month period, ending May 31, 1931, for street railway lamps, together with other pertinent information.

5. *Car Trucks*—Revision of Manual Section E2-27 to reduce the possible end play of the axle by $\frac{1}{8}$ in. was recommended. A study of nosing was made, with the result of an alternative type of journal bearing with a flat top to eliminate rolling out of place, along with a buttonless axle and wedge which takes all the end thrust on the end of the axle. Another design of flat top bearing was also submitted for use with the standard axle. An alternative design of brakeshoe key was submitted, which is thicker than the standard key, and is designed to prevent loose keys. Replies were received from about 29 companies on roller bearings, but no conclusions were drawn from the data collected.

7. *Trolley Buses*—A set of rules and regulations based on car wiring, but reworded, as proposed by the N.F.P.A. was presented. The latest design of swiveling type shoes has greatly improved operation over the heavier trolley wheel, it is stated. Standardization of motor-mounting bolt holes for the 50-hp. motor was proposed, as well as standardization of preparation of the armature shaft for speedometer or odometer drive, nomenclature and designation of motors and trolley buses. It was recommended that in wiring trolley buses or reading wiring diagrams, the left-hand trolley base be considered as positive.

8. *Air-Operated Car Equipment*—A number of practices tending to reduce the use of air and so prevent over-heating of the compressor were recommended. Methods of installation of air piping were proposed. The precipitation of water from compressed air and the main reservoir cooling system was discussed in an appendix, and the method of installing a radiating pipe to eliminate danger of frozen air equipment was proposed.

9. *Noise Reduction*—Investigation of resilient wheels was continued. Tests were made on the Lauhoff type wheels, but have not progressed sufficiently to be presented in the report. Tests made during the year confirmed the previous report that a cushioning of rails in track construction would reduce the sort of noise produced by the car by at least 25 per cent. Sound determinations on gear cases of standard types as compared with similar ones covered with a heavy coating of a rubber-like cement were made. By this method, the noise was reduced as much as 40 per cent. It was recommended that soundproof gear cases, floors, wheels and trolley bases be used, as well as a form of track construction in which the rail vibration is muffled. It was recommended that lightweight cars be developed, with a maxi-

mum of the car structure being spring borne.

10. *Rheostatic Car Heating*—Information has been collected on this subject, and plans have been made to conduct a series of tests on several properties to determine the proportion of heat that can be supplied from a rheostatic source. Those companies which have experimented already show that it is possible to obtain 30 per cent to 60 per cent of the heat required in this manner.

13. *Limits of Wear*—It was recommended that limits of wear be adopted as recommended practice: On interurban cars, no wheels to have more than $\frac{1}{8}$ in. hollow tread; treads not to be more than $3\frac{1}{2}$ in. wide; original clearance plus wear between pedestal guides and journal boxes to be limited to a total of $\frac{1}{4}$ in. for either lateral or longitudinal movement. Further study of the subject was also recommended.

Way and Structures Division

1. *Manual Review*—Changes in Manual Section W 42-29, specifications for design and manufacture of tie rods, were recommended. It was proposed that a new Manual section be adopted covering recommended standard specifications on track bolts and nuts, to be identical in structure with the A.S.A. specification covering similar material. It was recommended that the A.R.E.A. girder rail section included in the 1929 A.R.E.A. Manual be included in the Engineering Manual of Recommended Standards. Revision of Manual Section W 21-23, specification for quenched carbon steel track bolts be taken up.

2. *Special Trackwork*—Data were obtained on the experiences of the use of the association's design of tongue switches and minor changes in the design for their betterment. Designs were also furnished for expansion joints. Designs for hard center inserts for mates are also included in the special committee's program.

4. *Wheel and Rail Contours*—Conclusions of the committee indicated that the problem is not very practical of using cylindrical wheels with rails having curved or sloping heads.

5. *Wood Preservation*—Information was given on the number of subjects, including economies obtained by operating utilities through the use of treated timber, possibilities of a combination preservative and fire-preventive treatment for timber, preservation of timber for use in car and bus construction and maintenance, and practice of boring preserved ties for spikes. The committee also stated that the subject has been quite thoroughly covered, and recommended that a small membership be continued to keep the industry in touch with new developments.

6. *Arc Welding*—Several changes in specifications for welding rods were proposed for consideration of the American Welding Society. Maintenance of the

present contact and working arrangement with the American Welding Society and the A.S.T.M. was recommended. It also was proposed that the committee personnel be reduced materially until such time as there is work of a more definite nature to be undertaken.

7. *Alloy Steels for Special Track-work*—Tests were continued on welds on special steels, including 11 to 14 per cent manganese steel, chrome-nickel steel and silico-manganese steel. These welds were made with various electrodes. A truncated cone was substituted as a drop test specimen for the sharp-pointed cone used in last year's tests. Detailed test results and a discussion by the members of the committee making the tests were included.

These tests covered a wide range of compositions and physical characteristics of alloy steels suitable for special track-work. They were made in several different laboratories under the direction of the chairmen of the subcommittees to which they were assigned. The indication was that the weld metal deposited should be of a hardness approximating that of the parent metal. In that event the cold working due to the blows of the hammer was better distributed and the deformation of any one part lessened. In general, the finding was that progress is being made, and that there is a trend toward definite conclusions which will be of great value in field work.

It was recommended that the study of alloy steel in use in special trackwork and the methods and materials for welding be continued. It also was recommended that the assignment of developments in the Sandberg sorbitic process of rail hardening be assigned to the committee on rails, No. 14.

8. *Pavement*—Studies of types of pavement, contour and foundation, and recommended types of construction suitable for modern heavy load conditions on city streets, were made by this committee. Attempts of previous committees to design typical track and pavement structures were not practicable, according to the report. A preliminary discussion of the economics of track pavement was made by this year's committee. This outlined a method of attack and presented formulas for investigating annual cost. It was recommended that the general subject be continued under the latter title.

14. *Rails*—A form for branding rails was recommended for adoption. The relation between the rail wear on a given section of track approaching stops and between stops was furnished by the Cleveland Railway, the results being given in an appendix. Information was presented on the mathematical properties of the association's standard girder rail sections. It also was proposed to include in the Manual the calculated weights of various rail sections.

Fake Accidents and Legal Problems

Considered by Claims Men

WHAT they lacked in numbers those in attendance at the sessions of the Claims Association on Tuesday and Wednesday made up in intimacy and enthusiasm. The opening session on Tuesday was begun as a luncheon meeting, continuing through the afternoon. C. E. Redfern, president of the association, and claim agent United Electric Railways, Providence, reviewed briefly the work of the previous year. Following routine business, there was lively consideration of the question of whether the association should act as a clearing house for information concerning fake claimants. The issue was discussed pro and con, as was also the question of the training of claims investigators. For various reasons, the proposal was abandoned that a formal organization be set up through which a clearing house might be developed in the claims field, but it was decided that the various companies should apprise each other through the association where cases arose that were palpably fraudulent in their aspect.

At the session on Wednesday, J. S. Kubu, chairman of the Committee on Uniform Negligence Law, and assistant superintendent of the accident department Cleveland Railway, presented his report. He went quite thoroughly into a discussion of the procedure connected with the introduction of a bill of this kind in the recent Ohio Legislature, a bill it was felt would have passed except for the confusion incident to the last minute conclusion of business in the Legislature. The bill was contested by the insurance group, but the Cleveland Railway openly sponsored the measure. In fact, officials of that company spoke in favor of the bill at Columbus. During the discussion, it was brought out that a court decision has been rendered in Michigan in which it is distinctly held that passengers in automobiles are not entitled to recover where negligence has been proved. H. R. Goshorn, general claim agent Philadelphia Rapid Transit Company, explained a somewhat similar law passed by the Pennsylvania Legislature four years ago.

Since G. T. Hellmuth, chairman of the Committee on Claims Association Work and its relation to the American and the Transportation and Traffic Associations, was not able to be present, his report was read by J. W. McCloy, who acted as secretary of the meeting. The opinion expressed was that the Claims Associa-



C. E. Redfern
President

tion can function most fully and in a most valuable way through separate sessions. The report by Mr. Hellmuth was received and placed on file. Secretary G. C. Hecker of the association was then called on by Mr. Redfern to explain the problem of the relation of the affiliated associations to the parent association. Mr. Hecker went into the relationship in some detail, but said that it seemed to him the present method of procedure was somewhat cumbersome in that, under it, an executive set-up was imposed upon the separate associa-



Chairmen of Claims Association Committees

- 1—Wallace Muir, Nominations
- 2—J. S. Kubu, Uniform Negligence Law
- 3—G. T. Hellmuth, Study of Claims Association Organization
- 4—Bert C. Wood, Claims Department Practices
- J. W. Giltner, Subjects

tions similar to that of the main association, a set-up that militated against the most expeditious handling of association affairs. It was his opinion that under any change made in the constitution, the claims men should be fully represented in the main committee activity. It was up to them to evolve a plan which they considered best suited to their requirements, and then to fight for it.

Owing to the unavoidable absence of Hon. Horace Stern, of Philadelphia, the address intended to be delivered by him was not made.

Since it also was impossible for R. H. Nesbitt, attorney for the Ohio Edison Company at Akron, Ohio, to be present to deliver his paper, "The Inter-relation of Claim and Legal Departments," it was read ably by Mr. McCloy. This paper was shot through with the dry humor for which Mr. Nesbitt is so well known.

At the conclusion of the reading of Mr. Nesbitt's paper, Mr. Redfern called upon H. R. Goshorn, the dean of the profession, to address the meeting. Mr. Goshorn, was visibly moved by this mark of recognition. He explained that it had been possible for him to attend only two of the meetings held in recent years, but that this had in no way decreased his real interest in the affairs of the claim agents and the problems that confronted them as a body. At the conclusion of Mr. Goshorn's remarks, Mr. McCloy referred to the fact that he had recently been apprised of the death in Seattle of George Carson, who was president of the association in 1915 and 1916, and who had long been active in claims work, having started with the Seattle Electric Company many years ago. Subsequently he served for a short while with the Fifth Avenue Coach Company in New York, but returned to Seattle. A resolution of sympathy was adopted for transmission to Mr. Carson's family.

J. W. Giltner was then installed as the new president. He said that the responsibility for the work of the association was not only his, but that of his associates. He made a strong plea for cooperation to re-establish the work of the association. As he saw it, there was some merit perhaps in Mr. Hecker's proposal to merge the work of the Claims Association more closely with that of the main body, but he apparently was not fully convinced that the method of procedure which has been suggested

was sufficiently tangible for him to attempt to subscribe to it at this time. In concluding the session, the past-president's badge was conferred upon Mr. Redfern. The roster of officials for the new year as elected following the report of the Committee on Nominations was as follows:

President—J. W. Giltner, chief claim agent Northern Ohio Power & Light Company, Akron, Ohio.

First Vice-President—L. H. Butterworth, claim attorney Boston Elevated Railway, Boston, Mass.

Second Vice-President—Trevor C. Neilson, claim agent of the East St. Louis

& Suburban Railway, East St. Louis, Ill.
Third Vice-President—G. T. Hellmuth, general claims attorney Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

Secretary-treasurer—Guy C. Hecker, general secretary American Electric Railway Association.

Executive Committee—Edwin J. Page, general claim agent United Railways & Electric Company, Baltimore; S. A. Bishop, general claim agent Pacific Electric Railway, Los Angeles; J. S. Harrison, general claims attorney Jacksonville Traction Company, Jacksonville, Fla.; Frank D. Edmonds, supervisor of claims Interborough Rapid Transit Company, New York.

times not only tends to destroy initiative on the part of the claim agent, but prevents him from maintaining a well-organized, close-knit and efficient claims organization.

I conceive it to be the duty of a well-organized claim department to make a prompt and careful investigation of each and every accident. The care and diligence to be used cannot always be measured by the apparent seriousness or lack of seriousness of the injury. In making an investigation it is, of course, important to locate all of the witnesses possible, but it is much more important that the statements actually taken reflect the facts as the witness knows and observes them.

From every viewpoint, in my opinion, it is most important that the statements taken from witnesses reflect the facts. The opinion of the legal department on the question of liability is based upon the facts which appear in the file. It relies upon the statements secured by the investigator as evidencing the facts surrounding the happening. I know of no more disconcerting thing in the trial of a case than to find that the statements set forth as facts by some of the witnesses are not the facts at all, but have been colored and distorted either by the witness or by the investigator taking the statement. In these days I am quite certain that the company, and its legal department as well, would prefer having the facts in advance, secured by a proper investigation, than to ascertain them afterwards and perhaps in the midst of a trial. The importance of securing the truth in investigation should be brought home to every investigator.

Perhaps the most frequent point of difference between the claim and legal departments has to do with the value to be placed upon a particular claim. Generally speaking, the legal department can determine the question of liability, and it is seldom that there is any difference of viewpoint between the lawyer and the claim agent upon that subject. However, when we come to consider the value of a claim there is frequently a divergence of opinion.

Personally, however, I feel that the claim department, and particularly the chief claim agent, if he is an experienced man, as he of course should be, is in a better position to judge the value of a claim than the legal department.

In our organization the claim department has followed what I regard as a very good practice by endeavoring to give the legal department certain ideas with regard to the claimant and the witnesses. The file generally contains statements which give in more or less detail the appearance and characteristics of the claimant as the claim agent observes them. The same is done as to the witnesses. This information is frequently very helpful to the legal department in assisting and fixing the valuation upon the claim.

The Inter-Relation of Claim and Legal Departments

By

R. H. NESBITT

Attorney Ohio Edison Company
Akron, Ohio

AT TIMES I have felt that there was a tendency on the part of some utilities to underestimate the importance of the claim department as a part of the organization. Some look upon it as a sort of barnacle, not ranking in importance with other parts of the work. In my humble judgement there is no place where the earnings can be more easily and quickly dissipated than through an undermanned, poorly organized and poorly supervised claim department. Not only is the work important from the standpoint of financial outlay, but it is equally important from the standpoint of public relations.

It is important, if the company is to have the confidence of the public which it serves, that its claim work be done intelligently, efficiently and in such manner as to leave as good a feeling with the claimant as is possible.

The taking of intelligent statements concerning accidents and the effecting of fair and prompt settlement is a matter that requires not only training but the right type of individual. In making investigations it is true as a rule that the sympathies of a witness to an accident are generally with the injured party, and consequently it is not easy to overcome this feeling and secure from the witness an actual statement of the facts. The witness is frequently hostile toward the company by reason of some real or fancied grievance growing out of some past experience in which he, himself, or some member of his family was involved. Again, the

witness is busy and does not want to be brought into the controversy. All of these factors make the work of the claim agent extremely difficult and, in my judgment, it requires a trained man and one qualified by temperament to cope with the situation which he meets.

The work of the claim agent is not only difficult but in many ways it is not very satisfying. You are never quite certain whether the settlement you have made is a good one, or a fair one; whether you have paid too much or too little; whether the injury claim is a real one or merely fanciful. You have no stick by which the particular injury can be measured. You are dealing with a very intangible commodity that has no market price—a fixed definite amount that can be ascertained by consulting some price list.

Moreover, I want to speak briefly concerning the matter of its supervision. In the first instance, I believe that there should exist between the lawyer and the claim agent a feeling of mutual respect. By this I mean, not only the respect which one man has for another as a man, born of the feeling that such a man is an honest, decent, right-thinking and right-acting individual, but a respect also for the work or task that each is attempting to perform. Sometimes there may be, and perhaps is, a tendency on the part of the legal department to forget or overlook the fact that the claim department has its own distinct job. Such an attitude is not productive of the best results and at

Accountants Study

Apportionment of Costs

REDUCED company income has given the accountant another grave responsibility, that of aiding in keeping up the net. Steady trimming of the expense account, reducing schedules, and saving wages, power and material, have necessitated an enormous amount of work by the accounting department in adjusting the various items and calculating the final results. With the expression of this thought, C. E. Yost, president of the association and treasurer and assistant secretary Delaware Electric Power Company, Wilmington, Del., opened the convention of the Accountants' Association on Tuesday afternoon. Although the association's members have been pressed for time because of the present emergency, the several committees, Mr. Yost stated, had labored diligently in the preparation of valuable reports. President Yost referred to the publication of answers to various accounting questions submitted to the committee on standard classification of accounts, and to the report on budgetary control, a timely contribution for guiding in the preparation of the annual budget for next year.

Following the presidential address, E. H. Utley, Jr., read the report of W. L. Davis on the annual convention of the National Association of Railroad and Utilities Commissioners. Mr. Davis referred to three committee reports of interest to the accountants and gave extracts from the recommended provisions for uniform laws on the issuance of public utility securities.

The report of the Committee on Standard Classification of Accounts, of which M. W. Glover, general auditor West Penn Railways, is chairman, was presented by E. A. Tuson, general auditor Public Service Co-ordinated Transport. Discussion of various costs offering difficulty in classification was entered by J. E. Heberle, P. C. Kilfoyle, L. P. Hixson and J. P. Hudson.

Mr. Tuson also read the report of the Subcommittee on Bus Accounting, of which he is chairman. Mr. Tuson said that the steam roads were also vitally interested in this work and supplemented the regular report with a statement of the several states that had adopted the standard classification in whole or in part.

An abstract of the report of the Committee on Budgetary Control, of which R. Gilman Smith, statistician the



C. E. Yost
President

North American Company, is chairman, was read by J. E. Heberle, assistant to the president of the Capital Traction Company. It was brought out in the discussion by C. R. Mahan, W. H. Scott, C. E. Yost, E. A. Tuson, J. P. Hudson, and C. Frankland that a budget is a real boon, particularly in a time like the present, if the department heads are alive to the responsibility of keeping within the budget. The above reports, as well as the other two referred to, are abstracted on the following pages.

Officers for the coming year, nominated by the committee headed by Edwin H. Reed, vice-president, Utilities Gas & Electric Company, are:

President—J. E. Heberle, assistant to president Capital Traction Company, Washington, D. C.

First Vice-President—E. A. Tuson, general auditor Public Service Co-ordinated Transport, Newark, N. J.

Second Vice-President—C. R. Mahan, comptroller Chicago, North Shore & Milwaukee R.R., Chicago, Ill.

Third Vice-President—E. H. Utley, Jr., general auditor Chicago, South Shore and South Bend Railroad, Michigan City, Ind.

Members of the executive committee—J. D. Evans, general auditor St. Louis Public Service Company, St. Louis, Mo.; John H. Moran, general auditor Boston Elevated Railway, Boston, Mass.; R. Gilman Smith, statistician the North American Company, New York, N. Y.; and C. Frankland, auditor Cincinnati Street Railway, Cincinnati, Ohio.

These officers were unanimously elected to head the association.

At the opening of the Wednesday session, C. R. Mahan stated for J. D. Evans, chairman of the Committee of Fare Collections, that no formal report had been prepared. Mr. Evans, however, prepared a comprehensive description of the fare structure of St. Louis and the systems of collection and accounting used in their connection, and Mr. Mahan abstracted its contents.

Mr. Mahan also presented the report of the Committee on Property Records, of which he is chairman. This report is abstracted elsewhere.

The accountants were addressed at this session on "Cost of Fare Collections" by C. W. Stocks, editor of *Bus Transportation*, and on "Individual Route Costs as Influenced by Fixed Costs" by I. O. Mall, research engineer transportation, New Orleans Public Service, Inc. Mr. Stocks gave a comprehensive list of all costs, both capital and operating, involved in the collection and accounting of fares, and urged that companies revamp their systems for the purpose of reducing expenses.

It was brought out in the discussion of the first paper by J. E. Heberle, C. E. Yost, C. H. Allen and C. B. Trubenbach that complicated fare systems for buses slowed up the service, involved large ticket costs, required extensive accounting and resulted in more errors. It was suggested that companies analyze their systems of fares to see to what extent they might be simplified.

Following Mr. Mall's paper, a number of questions were asked on the bases used in the computation of route costs and on the extent to which such a survey could be used for an entire system. E. A. Tuson, J. E. Heberle, Dean J. Locke, C. E. Yost, H. R. Bigelow and E. H. Utley, Jr., contributed in this discussion.

Following the report of the Committee on Resolutions, read by W. H. Scott, the new officers were installed and the past-president's badge given to C. E. Yost. The incoming president, J. E. Heberle, urged the members to become familiar with all of the departments in the transportation business and to strive for a maximum degree of cooperation in the solving of company problems.

Cost of Collecting Fares

By

C. W. STOCKS

Editor *Bus Transportation*



C. W. Stocks

WITH the growing tendency to use several classes of fares, it would seem that the time is right for management to analyze the methods and practices that have grown up over a long period of years, to see if, by revamping, improvements cannot be made that will effect a material saving in the expense of this most important phase of transportation.

To simplify the problem, so it may be easily understood, and in order that the full cost may be included, "The Cost of Collecting Fares" can be broken down easily into major items, the sum of which will represent the total money cost. These are: (1) Interest on plant and equipment used; (2) cost of supplies; (3) labor required for auditing and checking collections; and (4) secret service inspection costs.

A listing of the capital charges would include the following:

1. Investment in storeroom fixtures—vaults, shelving, office furniture.

2. Investment in distributing facilities—boxes, trunks, bags, locks, keys, trucks, cars.

3. Investment in facilities at point of issuance—safes, shelving, locks, keys, office fixtures, furniture.

4. Investment in collection devices for use on cars and buses—overhead registers, registering and locked fare boxes, turnstiles.

5. Investment in mountings on cars and buses for collection devices.

6. Boxes, receptacles, etc., provided fare collectors—change makers, ticket punches, work boxes, change booths.

7. Fixtures and furniture at receiving points for vehicle operators—coin counting devices, safes, money bags.

8. Fixtures and furniture at auditing points for revenue turn-ins—furniture,

(A) *Tickets*—Number and class of each printed per year, number sold (recorded in ticket float account), number collected, per cent of waste or waste cost, shipping charges from printer.

(B) *Tokens*—Number and classes purchased, number sold, number collected, replacements needed, shipping charges from manufacturers.

(C) *Transfers*—Style and type used, individual routes or system, cost of printing, number issued, number collected, shipping charges from printer.

2. Storage and auditing charges—rent of storage space for tickets, tokens or transfers prior to issuance, wages of storekeepers, auditors for checking purposes and other employees, routine stationery costs (report blanks, record books, letterheads, other office supplies).

3. Distribution costs on system for tickets, tokens and transfers—repairs to boxes, trunks and bags or other means of shipment, trucking charges from storerooms to points of issuance. (Labor, gas, oil, maintenance of vehicle.)

Determining Route Costs

By

I. O. MALL

Research Engineer, Transportation
New Orleans Public Service, Inc.
New Orleans, La.



I. O. Mall

available, as determined by the book value of fixed capital.

It is of particular importance that those items of physical property specifically chargeable to a route be shown separately from the remaining items, which are applicable against the system as a whole and chargeable to each route on an equitable basis. The problem of roadbed valuation is complicated because of the various types of track construction encountered, and the further fact that the classified accounts treat the unit parts of the structure as separate and apart from the whole. The amount of the roadbed investment

for a particular route is measured largely by the physical requirements of the streets over which the route must pass.

It is also desirable to develop a unit value for each type of street car operated. Here again the problem is complicated, in that the classified accounts separate the electrical equipment of cars from the cars themselves. A detailed valuation of individual cars with their proper equipment must necessarily be compiled.

In one table may be outlined the investment by divisional items for a typical car line, in relation to the investment for an entire system of which this line is a part. This table also should show the amount of fixed

charges consisting of interest, renewals and replacements and property taxes. The divisional maintenance and operating expenses for this same line may be shown in a second table. Unless special cost records have been developed, these charges must necessarily be taken from the classified accounts and allocated to the respective routes on an equitable basis. From the developed costs provided by these tables, there may be shown in a third table an income statement indicating the return on the investment required for its operation. A similar statement for each route of a system provides an indication of the relative ability of the respective routes to absorb the investment and operating costs of the entire system.

draft as it now stands is in substantial harmony with the A.E.R.A.A. standard classification.

Budgetary Control

Last year the committee ascertained the reaction of many railways to the usefulness and desirability of budgetary control. Among other questions, member companies were asked whether the committee should make a detailed study of budget procedure, and, if so, in what manner such a study could be made most useful to electric railways. It was the majority opinion of the replies received that the committee should undertake an investigation of this sort.

An examination of the suggestions offered to the committee indicated that the reporting railways were most interested in the following phases of budgets and budgetary control:

1. Clarifying the use and functions of the budget idea.
2. Outlining the method and technique of budget procedure.
3. To present for study a number of budget systems, methods and forms actually in use in other companies, so that comparisons may be made and desirable modifications instituted.

In its report, the committee felt it desirable to clarify the use and functions of the budget idea first.

Following a detailed outline and description of the budget system, the report appended explanations and typical forms covering the operating budget and cash requirements budget in use by the Cincinnati Street Railway, and the construction budget procedure in use by the subsidiaries of the North American Company.

Property Records

Property records of a carrier should be kept in sufficient detail to determine and assemble readily the various elements of costs comprising the plant account for the specific purpose that the information is intended to be used. Financing capital expenditures, rate making, and the creating of reserves for depreciation, or renewal or retirement, all are dependent upon certain recognized elements contained in the investment of road, equipment and property accounts.

The purpose of the committee was not to recommend any fixed procedure at the present time, but rather to stimulate the interest of the accountants in this important phase of accounting, in order that the association may be in a better position to consider the problem when it may become necessary to comply with regulations of a uniform classification, prescribing definite units to be considered in the matter of depreciation.

The report outlined in detail the procedure now followed by one of the member companies which finds it satisfactory to meet all present requirements.

Accountants' Committees Make Valuable Reports

FOUR major committees of the Accountants' Association prepared reports during the year for presentation at the convention, the Committees on Standard Classification of Accounts, Bus Accounting, Budgetary Control and Property Records. The Committee on Fare Collections made no formal report or recommendations.

Standard Classification of Accounts

On April 2, 1917, the Interstate Commerce Commission issued Bulletin No. 14, listing 440 interpretations in answer to questions relating to the uniform system of accounts issued by the commission in 1914. Since that time, many more questions have been sent in for interpretation. The accountants' committee has an arrangement with the Bureau of Accounts of the I.C.C. to the effect that before rendering a decision on any questions raised, the bureau will submit the questions and proposed answers to the accountants' committee for consideration and discussion. The important questions, secured from the committee's files, were printed along with the answers in the appendix of this year's report. The answers have not been formally issued by the commission, and are, therefore, subject to revision. A total of 146 questions, covering the classification of many types of charges were answered in the report.

Bus Accounting

During the past year the work has been almost entirely limited to contacts with other bodies looking toward the adoption of a uniform accounting system



Chairmen of Accountants' Association Committees

- 1—W. L. Davis, Representative for Accountants' Association at Annual Convention of the National Association of Railroad and Utilities Commissioners
- 2—R. Gilman Smith, Budgetary Control
- 3—M. W. Glover, Standard Classification of Accounts
- 4—E. H. Reed, Nominations
- 5—Charles R. Mahan, Property Records
- 6—E. A. Tuson, Subcommittees on Bus Accounting
- J. D. Evans, Fare Collections
- J. E. Heberle, Subjects

that would be accepted and recognized throughout the country. The committee's contact with the Interstate Commerce Commission resulted in the drafting of a tentative classification which the commission, however, has not yet seen fit to issue. The main reason for this is that Congress has not yet given the commission authority over motor bus operation. Pending the enactment of some such legislation, the Bureau of Accounts is holding the matter in abeyance instead of submitting it to the various State commissions and other interested bodies for their approval. It should be remarked that the tentative

T. & T. Association Studies

Results of Committee Work

COMMITTEE accomplishment during the past year formed the basis for the major part of the discussion at the two sessions of the Transportation and Traffic Association at the Atlantic City convention. "Never, during my sixteen years service with this association," said President Paul Wilson in his opening address, "have the members devoted so much effort or given so willingly of their energy for research work than during the past year. The plan decided upon in California in 1930, to bring all committees together during the year, was carried out in meetings at Cincinnati and Chicago, and the results have been so satisfactory that I heartily indorse the continuation of that policy."

Mr. Wilson discussed current economic conditions as they affect transportation and traffic. "How is it possible," asked Mr. Wilson, "to furnish a reliable public transportation service, a rapid service, a safe service, comfortable and economical transportation, if we are not to be protected by adequate regulation of traffic? How shall we meet the competition of the privately owned car, street stored at public expense? How much longer shall we discomfort our patrons to avoid collision with traffic forced into the path of our vehicle to avoid the parked vehicle? The franchise right to transport passengers for hire is a mockery when the streets in which this right has been given are contracted from highways to lanes and at times to "no thoroughfares"? The monopoly of the public carrier in most cities is today synonymous with liability. It has been a frequent plaint of many of us in this association that the executive heads of our companies have been too often unacquainted with their business as seen through the eyes of the traffic employee. I firmly believe that our present adversity may, in this particular, be a blessing disguised, because with expense mounting in direct proportion to the growth of this congestion of our streets increased income cannot be secured, for we are prevented from the real use of the facilities we operate. No problem in this industry is so pressing for solution as how to remove the unnecessarily parked automobile from the public highway. We still are the carrier



Paul E. Wilson
President

of a majority of the people. Surely the rights of the majority must prevail and just as surely must we assert their rights."

Following Mr. Wilson's opening address, the association heard the annual reports of the Executive Committee and the secretary-treasurer, and approved the recommendations of the Committee on Nominations by electing the following officers for the coming year.

President—R. N. Graham, vice-president and general manager Youngstown Municipal Railway.

First Vice-President—F. L. Butler, vice-president Georgia Power Company.

Second Vice-President—Adrian Hughes, Jr., superintendent of bus transportation, United Railways & Electric Company, Baltimore, Md.

Third Vice-President—D. L. Fennell, general superintendent of transportation, Kansas City Public Service Company.

Secretary-Treasurer—Guy C. Hecker.

For members at large to the executive committee:

C. H. Evenson, superintendent transportation Chicago Surface Lines.

W. W. Holden, manager San Antonio Public Service Company.

R. W. Emerson, vice-president Cleveland Railway.

R. W. Emerson, vice-president Cleveland & Western Railway.

The first subject brought to the attention of the association was that of the

transportation employee. Clinton D. Smith, general manager Philadelphia & Western Railway and chairman of the Committee on the Transportation Employee, read the committee's report which recommended the broader use of the industrial talking movie in educational work. The recommendations of this committee will be found elsewhere in this issue.

A paper prepared by R. S. Soule led the discussion on this report. He indorsed the recommendation of the committee for the use of industrial talking pictures, but added that in his opinion it should in no way interfere with the conference method of education which has been so successful.

The report of the Committee on the Passenger was then presented by W. B. Brady, vice-president Central Public Service Corporation. The report summarized an intensive study on the subject of surveys and their use in a number of cities throughout the country. This committee urged the use of employees for making the survey. An abstract of the report follows this article.

A. F. Blaser, chief engineer Cleveland City Commission, in a prepared discussion read by the secretary, summarized this report on the passenger by pointing out the likes and dislikes of the public at large. In substance, he showed that a company operating with low fares and convenient transfer system, with speed, comfort, convenience, economy and dependability gave a security to the public, not only to the habitual rider but to the occasional rider as well.

A. J. Fink, director of transportation St. Louis Public Service Company, and J. H. Pritchard, manager Lynchburg Traction & Light Company, Lynchburg, Va., discussed the subject of transportation surveys in St. Louis and Portland, Ore., respectively. Mr. Fink told of the general merchandising plan being carried on by his company and showed how, by use of personal contact and the radio, the public was kept informed of major improvements and developments. He particularly explained how the personal element phase of the survey overcame the obstacles in changing operations of lines from two-man

to one-man operation. Mr. Pritchard based his discussion on the transportation analysis made in Portland, Ore., where he was located before going to Lynchburg. He stated that the survey there brought to the front such criticisms of company operations as inconvenient transfer points, lack of comfort, poor ventilation, inadequate knowledge of schedules, safety, and claims practices.

Although it was conceded that a transportation survey was, in some form or other, necessary and desirable in giving the public what it wanted, there was a pronounced dissent to the method outlined in this committee report. Alonzo R. Williams, vice-president and general manager United Electric Railways, Providence, R. I., J. B. Stewart, Jr., general manager in charge of operation Cincinnati Street Railway, and Eustace Smith, Jr., executive assistant Toronto Transportation Commission, frankly opposed the employee personal contact with the public in the matter of surveys of this nature. Mr. Williams obtains information of the public's wants through his employees in every-day contacts without special solicitation. Mr. Smith explained the functioning of a transportation research department in Toronto and how it keeps in contact with public desire and opinion for the guidance of his company's development and improvement programs.

R. N. Graham, vice-president and general manager Youngstown Municipal Railway, and W. W. Holden, manager San Antonio Public Service Company, expressed the opinion that personal contact surveys emphasize details of operation which are sometimes overlooked by the management, and that by means of these surveys criticisms and comments are obtained from people who are not regular passengers. H. R. Biery, director of public relations Cincinnati Street Railway, asked the association to give special consideration to the point brought out in the committee report with regard to special or reduced fares in the evening hours when groups of several persons or families usually avail themselves of private transportation vehicles.

The second session of the association was also devoted to the study of committee reports. The report of the Committee on Operating Economics was placed before the meeting, approved and accepted without reading because Joe R. Ong, director of research Cincinnati Street Railway, chairman of this committee, used this report as the basis of his address before the general session on Thursday morning. The report is abstracted elsewhere in this issue.

C. W. Wilson, manager of research department Pittsburgh Railways, as chairman, reported for the Committee on the Movement of the Vehicle. This report presented a study of many factors

of operation, equipment and traffic which affect the movement of street cars and buses in the city streets. An abstract of this report appears elsewhere.

This report brought out a long and interesting discussion. D. J. Graham, manager of railway utility Winnipeg Electric Company, led the discussion by commenting on equipment, schedules, car stops and traffic interference. He recommended reconstruction of cars to obtain the best possible circulation of passengers, improved braking equipment to obtain faster deceleration rates, the adoption of motors to obtain higher speeds, and the installation of better seats, good lighting and ventilation.

Burton Marsh, traffic engineer City of Philadelphia, was the second speaker in this discussion. He commented on the report, and, from the standpoint of equipment said that the railways had to improve their equipment to set aright an automotive-minded public. He urged the railways to lead in fostering intelligent traffic regulation by community officials, and pointed out the necessity of discipline in the operation of traffic systems. He recommended the use of safety zones wherever possible and stated that railway managements could be of great help to traffic officials in getting these established. Mr. Marsh discussed signals and other devices for traffic control.

E. J. McIlraith, staff engineer Chicago Surface Lines, offered several

constructive criticisms of the report. He objected to a statement which indicated that the gas bus and trolley bus are generally accepted as being better able to negotiate modern traffic. He stated very emphatically that under like conditions of traffic density, street cars will move at greater speeds than gas buses or trolley buses. Mr. McIlraith discussed schedule construction and maintenance and pointed out the necessity for having experts do the engineering work in the construction of schedules.

A. R. Williams, vice-president and general manager United Electric Railways, Providence, stated that management must approach the problem of vehicle movement from the angle of the community as a whole and recommended co-ordinated effort with city authorities to remove factors which are now hindering efficient movement.

T. Fitzgerald, vice-president and general manager Pittsburgh Railways, told of the accomplishments in Pittsburgh as a result of an expert engineering approach to the subject. He told how the rewinding of motors on cars had permitted speed increases of as much as 17 per cent and showed how the faster service had increased revenues.

At the end of this session Paul Wilson, as president of the association, installed the new officers and received the past-president's badge from R. N. Graham, the incoming president.

T.&T. Committee Accomplishments

The Passenger

This report presented a plan for obtaining a qualitative analysis of the business of transportation. It stressed the benefit which will accrue to any company which goes out, with its own men or with professional outside help, to determine the sales possibilities of the product it has to offer to its local public. This not only brings to the knowledge of the residents through the visit of a courteous employee the existence of an up-to-date transportation system ready and anxious to serve them, but these same employees return to the office and bring not only that criticism which makes for more efficient service but encouragement as well and "leads" for the further sale of transportation.

Furthermore, in their capacity as interviewers the men meet the public in an entirely new relation and have an opportunity perhaps for the first time for many of them to obtain the point of view of the passenger.

In cities where surveys have been made, careful study was made in advance in order to obtain opinions from representative sections of the community. Such sections were divided

into income groups, groups living near the established transportation facilities or farther away from them, automobile owning and non-automobile owning groups, etc.

In the group living at a distance from established facilities, the predominant demand was for some kind of transportation, both from owners of automobiles as well as non-owners. These surveys are, in fact, the finest evidence ever collected of the essential part that public transportation plays in urban life. Many were assured by real estate agents that such transportation would be provided, but now blame the transportation companies for the plight that they are in.

These surveys establish the rapidly growing realization on the part of owners of the difficulty of using automobiles in cities except at night, due to traffic congestion and parking troubles. But at night, for attendance at places of amusement the automobile shows no waning popularity. This is partly because such use is frequently for several persons or whole families where the cost of individual street car rides becomes large in proportion. The committee believes that earnest attention

should be given to the possibility of winning back these family groups through some form of fare reduction during the off peak hours.

These surveys showed the transfer is by no means popular, especially in cities where winters or summers are severe. Evidence shows that passengers will do much to avoid the inconvenience of transferring. The committee urged the necessity of a careful study of routing with more consideration to the passenger and perhaps a little less to the operating department.

The Transportation Employee

Particular attention was given in this report to a recommendation that the development of the transportation employee be facilitated through the use of the industrial talkie. Numerous practical methods were found on many properties for training transportation employees for higher standards of service. It was the opinion that the industry should concentrate on the supervisors to train them for higher standards of performance. It was convinced that success of training or sales programs required first that the supervisory group become not only sales-minded but also fully competent to enforce training programs.

Practices used by competitors in carrying on their sales training programs were summarized. Tire manufacturers and distributors of automotive fuel supplies use the industrial talkie extensively in their sales development schedules. For instance the difference between profitable and unprofitable operation of a service station apparently depends upon two major factors, which have analogies in the transportation field:

1. Keeping the customer's gasoline tank filled, his engine properly supplied with oil and his car adequately equipped with tires.

2. Making the sale the occasion for a perfect contact.

The chief competitor, therefore, is the service station as much as it is the automobile itself. Hence recognition must be given to the sales instructions for service station attendants, a group who in average intelligence are comparable with the operators in the transportation industry. This method involves the industrial talkie to a greater degree than any other item. It has the following advantages:

1. Eliminates unprepared speeches and instructional programs.
2. Avoids repetition of statement and, therefore, boresome material.
3. Secures the most effective delivery of the instructor or executive.
4. Affords unlimited use, and conserves time.
5. Secures the talent of executives now going to waste for lack of time to make contacts with employees.
6. In training and sales programs, the talkie secures in dramatic style: (a) Vis-



Chairmen of Transportation and Traffic Association Committees

- 1—Samuel Riddle, Nominations
- 2—C. Datz, The Equipment
- 3—Clinton D. Smith, Transportation Employee
- 4—C. W. Wilson, Movement of the Vehicle
- 5—Joe R. Ong, Operating Economics
- 6—W. B. Brady, The Passenger

ual illustration of sales principles; (b) carefully prepared instruction; (c) 100 per cent standardization of instruction; (d) maximum coverage of employees.

The committee believed it would be possible to prepare industrial talkies which would include fundamentals of training applicable to any transportation company. It discounted the contention that each company has a local situation which would prevent the adoption of a general film. Attention was drawn to the fact that competitors refrain from the use of a home-made preparation of industrial films but present their sales problem to specialists who properly dramatize the situations and use the technique possessed only by a film service organization.

The committee recommended that an appropriation be authorized next year for the making of a 1,000-ft. talking movie, under the supervision of a joint committee representing both associations and the Director of Advertising, which would be made available to member companies at a nominal cost. An appendix listed a number of situations suitable for film adaption.

Movement of the Vehicle

Enough has been done to demonstrate without question that the street car can once more resume its place and hold its own in urban traffic, according to the committee. It stated its belief that no one factor can do more to stimulate the morale of the industry and to improve public attitude toward it than the return of a common conviction by operators and the public that a modern street car is not an obsolete impediment in city traffic and that it can move aggressively with the traffic stream. While the effect of such an intangible as movement cannot be measured exactly, it exerts a powerful influence upon the general outlook of the industry, the attitude of executives, the morale of trainmen, the satisfaction of the present riders, the

appeal to the potential riders, the impression upon the general public and upon municipal administration officers.

Movement involves reduction of time between terminals, of course, but there is much more than just "so many miles per hour." For many years the statement that "the street car is the slowest vehicle on the street" has been dinned into our ears. To a large extent this still is literally true. To say that the industry has been whipped and has not been doggedly trying to absorb the blows that have come in the process of the change from a monopolistic to a keenly competitive field would be unfair and untrue. Reason has insisted that mass transportation is a vital necessity of populous communities, that the street car is the one economical mass carrier, and that stabilization and improvement would inevitably materialize. There is no denying, however, that the inability to re-equip completely with new, modern vehicles and the disheartening effects of traffic interference have had their adverse influence upon initiative and enthusiasm.

But there is now a new note. Executives, patrons, street car operators, and automobile drivers have seen street cars hold their own in the traffic stream with automobiles that were in the habit of cutting in on them at will. Many of these were new cars of new design, but among them were some of the same street cars that had in the minds of some been relegated to a position of permanent obsolescence. Car operators have felt a new encouragement when the response to their controllers made automobiles hesitate and then show signs of respect. Passengers have experienced and felt the satisfying pull of a quick, yet smooth, acceleration that has put them on even terms with automobile drivers in getting away from stops. And in many instances, so far as outward appearance goes, they were the same cars that had been in service for years.

Accomplishments so far have been relatively modest. They definitely indicate, however, what the possibilities are. Refinements to the improved equipment are needed and are being worked upon. The important thing is that a reasonably effective, tangible answer to the problem of negotiation of modern urban traffic by street cars—not only by new cars but by cars that are not new—is being daily seen and experienced.

The committee chose the following factors for their study of vehicle movement.

1. Equipment: With emphasis on street cars now in service.
2. Factors affecting movement, other than equipment, over which transportation officials have direct control.
3. Factors involving traffic interference over which electric railway transportation officials do not have direct control.

Bus Men Discuss Legislation and Sales Promotion

Fifth Annual N.A.M.B.O. Convention held at Atlantic City gives members opportunity to inspect A.E.R.A. exhibit

CONSIDERATION of the need of securing federal regulation of interstate bus operations, ways of promoting traffic sales, the necessity of improving the safety of operation and the development of terminal facilities occupied the attention of delegates to the fifth annual convention of the National Association of Motor Bus Operators held at Atlantic City, Sept. 28 and 29. For the first time the bus meeting was held simultaneously with the A.E.R.A. convention, thus affording bus operators an opportunity to inspect the annual exhibit. Arthur M. Hill, president Blue & Gray Transit Company, and also president Charleston Interurban Railroad, Charleston, W. Va., was re-elected president of the organization, and R. T. Whiting, vice-president and general manager, Washington Motor Coach Company, Inc., Seattle, was re-elected vice-president.

An address by Senator Barkley, of Kentucky, member of the Committee on Interstate Commerce of the U. S. Senate, on the necessity and desirability of interstate bus regulation was presented at the convention. The Senator expressed the opinion that legislation should be enacted at the coming session of Congress, and that it should include provisions for the issuance of certificates of convenience and necessity and protection for carriers already furnishing satisfactory service.

The previous bill, designed to secure regulation, has failed of passage, the Senator said, due to difficulties in securing agreement on details, and not because of differences as to whether or not there should be regulation of interstate bus operations. He referred, particularly, to the amendment which was introduced at the last session which would have made it mandatory for the commission to issue duplicate certificates over the same route. In his opinion, those who have pioneered and developed a service should be protected and given the opportunity to furnish the service deemed necessary before another company is given permission to operate over the same route. Inasmuch as bus operators, railroads and their employees, State regulatory authorities, and the Interstate Commerce Commission are all urging the passage of the legislation desired, he said he could not see how Congress could long postpone passage of a suitable measure. In his opinion bus operation is as much a pub-

lic utility as water, light and gas companies and therefore just as needy of regulation for its own as well as the public's protection.

Improvements in terminal facilities were reported to be progressing steadily according to the committee studying this phase of bus operation. It was suggested that operators should devote more attention to the education of their agents to sell through transportation, establishing a particular counter for this purpose if the city is large enough to warrant it. The use of a national guide was advocated in the belief that a greater dissemination of schedule information will react in the increased sale of through tickets.

Elimination of exhaust and engine odors from the bus body was suggested by the Committee on Equipment Development, H. B. Hewitt, chairman, as of paramount importance. The increase in the ratio of horsepower per unit weight was cited as one which should mean better schedule performance. Steering ease incorporated in some of the newer vehicles would eliminate driver fatigue, it was said, and should promote greater safety of operation.

More care in advertising by the spending of money where greater value could be obtained, the employment of advertising counsel and the use of co-operative methods was reported by the Committee on Advertising, C. W. Stocks, chairman, as the principle development in this field of sales promotion.

A resolution authorizing the preparation of a bill to be presented to Congress on practically the same basis as the one previously drawn followed the Legislative Committee's report, which was presented by S. A. Markel. Another resolution put the association on record as opposed to the placing of tariffs on importations of petroleum and its products.

The contention that bus lines do not pay sufficiently for the cost of highway construction and maintenance and do not contribute sufficiently to the general cost of government should be countered by acquainting the public fully with

what the buses are now paying, in the opinion of Ivan Bowen, attorney Greyhound Lines.

How a large company educates its ticket agents and information clerks was described by J. B. Walker, Greyhound Lines. By using a series of charts, agents become acquainted with the rest of the organization and are shown what their function is in the promotion of the company's business. The importance each agent and each passenger secured bears to the company's success was carefully pointed out.

That safety in operation is a factor in the promotion of sales and in the reduction of costs was indicated by the remarks of Marcus Dow, safety director Greyhound Lines. Training of drivers, he said, must be started before the man is put to work and continued during the whole period of his employment. It is essential to keep up interest in accident reduction, and to do this the entire corps of driver supervisors must be equipped to command continued attention to the subject all the time.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, urged operators to exert every effort possible to cultivate the friendly co-operation of other highway users. He suggested carriers consider that even though they feel that they are highly taxed, the vast majority of highway costs are still being borne by the private car owners.

The second afternoon session was devoted to the presentation of *Bus Transportation's* second annual awards to those companies which had shown the greatest improvement in the efficiency and operation of their maintenance departments. Presentation of the awards was made by L. F. Stoll, publishing director of *Bus Transportation, Aviation, and ELECTRIC RAILWAY JOURNAL*.

Awards were made to Community Traction Company, Toledo, and Capital Traction Company, Washington, D. C., in the city classification, and to Blue & Gray Transit Company, Charleston, W. Va., and Blue Ridge Transportation Company, Hagerstown, Md., in the intercity group. Two awards for both city and intercity companies were made, depending on whether the annual mileage was more or less than 3,500,000.

The convention voted to hold the annual meetings for the years 1932 and 1933 at Chicago.



Panoramic view of the Boardwalk Pageant depicting mass transportation in its many phases

Co-ordinated Transportation *Features*

Golden Anniversary Exhibit

NEVER has a more striking picture of co-ordinated transportation been presented than was portrayed by the exhibit at the 50th annual convention of the A.E.R.A. at Atlantic City, Sept. 28-Oct. 2. This year's show was the first in two years, there having been no exhibit at San Francisco in 1930. Since the 1929 exhibit, which was the first held in the auditorium, advances in products available to the transportation companies have been many. New types of cars, buses, trolley buses, electrical and mechanical equipment, track materials and accessories have been developed. The floor area covered by the exhibit this year was 80,347 sq.ft. A total of 123 exhibitors were represented.

To observers it appeared that the exhibitors this year utilized the space at their disposal to better advantage than in past years. Perhaps fewer products were shown, but the manufacturers placed greater emphasis on the latest developments. In the past two years the research of the manufacturers has brought out new designs, which while not in all instances embodying radical changes, showed marked refinement from previous models. Detailed refinements of design and production that were born of experience in the field and in the laboratory were incorporated in a large

number of the products exhibited. A touch of the historic, contrasting the old with the new, the past with the present, added considerable interest.

For the convenience of the delegates the displays were arranged in groups according to the type of products. Especially prominent was the impressive display of the Aluminum Company of America, which occupied the entire stage. Immediately in front of this was the section devoted to motor vehicles, automotive accessories and tools. The remainder of the floor was filled with railway accessories, carefully grouped, with the trackwork and maintenance-of-way exhibits occupying a section on the south side of the floor.

TRANSPORTATION PAGEANT ATTRACTIVE

Among the displays that were outstanding, judged by the interest of the visitors, might be mentioned the Boardwalk pageant of vehicles on the Convention Hall Plaza, which was arranged by the Manufacturers' Advisory Committee to commemorate the golden anniversary meeting of the American Electric Railway Association. This display brought together all of the units except a rapid transit car that might be used in a co-ordinated transportation system for a large city. It consisted of ten separate vehicles all finished in a

uniform attractive color scheme of light green and white, so that the interest would center on the vehicle itself rather than on some peculiarity of external finish. Heading the column was a high-speed interurban car of the Philadelphia & Western Railway. Following this was a large city car, then a medium-sized city car. Then came a 40-passenger trolley bus and a 30-passenger trolley bus. Four buses appeared in order of size: a 42-passenger, a 38-passenger, a 31-passenger and a 21-passenger. A taxicab brought up the rear of this column. A pleasing historic touch was added to the pageant by the display of a horse car of the vintage of 1882, by its contrast showing the tremendous strides that have been made in the mass transportation industry.

Much interest was shown in the Philadelphia & Western car, which was developed jointly by the railway and the J. G. Brill Company after more than a year's research. It embodies radical departures from standard practice. Its streamlined exterior with wedge-shaped front windows was striking. Being designed to cut down wind resistance at speeds of 80 m.p.h., it gave the impression of speed. The design carries out many of the trends of recent years. The body is all aluminum except for the body bolster and the roof carlines.

To the left of the P. & W. car was a large city-type car, one of an order for 130 built for the city of Detroit by the St. Louis Car Company representing the modern type of heavy city cars. Next in line was a double-truck medium-sized city car built for Santiago, Chile, by the J. G. Brill Company.

Following the three cars was a standard 40-passenger trolley bus built by the Twin Coach Corporation. It has the new central control design for electrical equipment, and was of the same general type as the trolley buses furnished to several systems.

Then came a Brill 30-passenger trolley bus of standard design, illustrating the smaller-sized vehicle of this class.

To the left of these vehicles were, in turn, four buses of various sizes. First was a 42-passenger bus built by Mack Trucks, Inc., for heavy service, with front entrance and rear exit. Next came a Model 54-A bus built by the White Company. It was of front-entrance, center-exit type, and seated 33 passengers. At its left was a Model Z-29 bus built by the General Motors Truck Company. It had an all-metal body, and was designed to seat 31 passengers. Fourth in the line of buses was a 21-passenger city-type vehicle of the Fargo Motor Corporation, designed for circulating load. The taxicab at the end of the line was a new model built by General Motors.

MAIN RAILWAY EXHIBIT IN AUDITORIUM

Inside the auditorium the display of street railway equipment covered a wide range. Trucks, motors and brakes were features in several of the exhibits.

Of three types of trucks exhibited, two were built for worm drive. The J. G. Brill Company showed its new 90-E truck, in which the drive, with a 7.1 to 1 reduction, consists of a hardened-steel worm meshing with a bronze worm wheel pressed directly on the axle.

The No. 52-C truck recently brought out by the Timken-Detroit Axle Company for city service was the feature of this manufacturer's display. This truck differs from the company's previous model, the 52-B, in having bronze journals and solid axle shafts. The worm gear set is of the underslung type with three-bearing worm shaft mounting. Automotive leaf springs carry the frame and motors and serve to maintain the axles in proper relation to each other.

Of interest in the car truck built for the Indiana Railroad and shown by the General Steel Castings Corporation was the inclusion in a single unit of the wheel piece members—transom, pedestals, motor support brackets and incidental brackets for hanging clasp brakes.

Motors covering the entire traction field were displayed by the General Electric Company. In addition, some old motor equipments were shown to

illustrate the many improvements that have been made during the last 30 years. The modern equipment included a 35-hp., 600-volt motor, designed for high accelerating rates, and weighing complete 1,500 lb. Another unit of recent design was the GE-1154, 600-volt, 50-hp. motor of high-speed design for trolley bus and street car service. It weighs complete 785 lb. Equipment for the modern gas-electric bus comprised a DT-1121 generator suitable either for single or double-motor drive and a GE-1151 motor used for double-motor drive. The latter unit weighs complete 510 lb. In the trolley bus field there was shown a Type PCM control unit designed for handling two 50-hp. motors, and a 10-ft. light-weight air compressor.

The Westinghouse Electric & Manufacturing Company's motor exhibit included seven types. The largest of these was the 190-hp., 600-volt motor built for the 300 cars to be operated in the New York City subway. This motor weighs complete 5,300 lb. Other displays showed the Type 511, 35-hp., 600-volt motor, with single-reduction gear, designed for 26-in. wheels in city service, and the Type 510-E, 35-hp., 600-volt motor, designed for 26-in. wheels, of which there are about 9,000 in service. Motors for trolley bus service included the Type 1426, 50-hp., 600-volt, high-speed motor weighing 830 lb., and the Type 1427, 35-hp., 600-volt, motor, weighing 630 lb. The Type VA trolley bus control equipment with foot-operated master controller was exhibited on a rack, with complete control apparatus for rear mounting. Other control equipment was the Type VA car control and the Type XM-39 recently ordered by the Chicago Surface Lines. Renewal parts were grouped by related lines. This display included complete field shunting equipment, motor parts, and electro-pneumatic valves.

Several attractive displays were devoted to brakes, bearings and gears for electric cars. In this group the Westinghouse Traction Brake Company featured the new self-lapping brake valve.

A traction booster, designed to afford greater retarding force to the car by means of magnetic shoes pulling the truck frame toward the rails to shorten the stopping distance, was also displayed. The Safety Car Devices Company had a complete operating model with air brakes and control equipment using the new type of self-lapping brake valve for hand and foot operation.

In this line of equipment, the National Brake Company displayed a Peacock 1250 brake, an improvement over the No. 440 brake, in use largely in the equipment of electric locomotives. It was displayed as the highest-powered hand brake on the market.

The American Brake Shoe & Foundry Company exhibited its A.E.R.E.A.

standard patterns of steel-backed brake shoes, and malleable-iron brake heads and keys. Clasp brake equipment, as used on multiple-unit high-speed trucks, and miscellaneous steel castings used in street railway work, were shown by the American Steel Foundries.

The Chillingworth Manufacturing Company exhibited a variety of gear cases; typifying modern construction and design, for both Westinghouse and General Electric motors. This company also showed for the first time a gear case which was treated with a compound to silence the noise caused by the gear and pinion.

To those historically minded the exhibit of the Tool Steel Gear & Pinion Company, showing the evolution of the Tool Steel gear in 25 years, was of special interest. In the line of more modern equipment this company showed a high-reduction unit for high-speed motors and a lead-quieited gear.

Of chief interest in the exhibit of the Johns-Manville Corporation was the full-size section of a street car insulated in the floor, walls and roof with Salamander car insulation. The ceiling of this car was treated with J-M acoustical correction. This system of sound and heat insulation and the acoustical correction have been installed in many passenger cars of steam and electric railways. For buses, the Johns-Manville Corporation displayed a complete line of friction material, which included the new molded and compressed lining for heavy mechanical brakes.

Evidence of the increasing use of roller bearings in cars was indicated by the exhibits of the Timken Roller Bearing Company and the Hyatt Roller Bearing Company. Both companies showed a complete line of roller bearings for cars. In addition, Hyatt displayed a roller bearing journal box.

Principal forms of aluminum used in railway construction were shown by the Aluminum Company of America, which included structural shapes; spun, die and permanent mold castings; forgings; fabricated sheet, plate and molding; cable and busbar; tubing and conduits. Several finishes for aluminum were also displayed. One of the items of great interest to railway men was a thin-wall conduit which weighs less than one-half as much as steel conduit. Another railway item was the stator frame for the Reading traction motor, said to be the largest railway motor frame casting of aluminum alloy.

The DuPont Company exhibited a large number of panels of different Dulux colors, its new type of finish for electric cars and buses. These panels were exposed alongside of paint, varnish and enamel finishes of the regular type to indicate improvements in durability. These displays were planned to

show a better retention of gloss, greater resistance to fading, elimination of failure by checking and cracking. The serviceability claimed for Dulux finishes is due principally to a new synthetic vehicle in the product.

Samples of Haskelite, Plymetl, flat Haskelite panels as used for bus floors, card racks and seats featured the display of the Haskelite Manufacturing Corporation.

CAR AND BUS ACCESSORIES HAVE LARGE SECTION

Displays of car and bus accessories took up a large portion of space in the convention hall. The general arrangement and attractive appearance of these exhibits fitted in well with the larger ones to create a noticeably superior appearance of this year's show. In this line of exhibits were many types of seats and seating material, door engines and door-control systems, heaters, turnstiles, registers, and other equipment. Noticeable among this class of exhibit were the great improvements made in door-operating mechanisms.

The National Pneumatic Company arranged effectively full-size working models of its latest door-operating systems in several table displays which included systems with vacuum door engines and pneumatic engines. Entrance to this booth was made through a treadle-operated door. The full-size models included a newly developed treadle-operated sensitive-edge door for buses. Among other doors with safety features were one model with a reversing door engine for buses, and a folding double door for electric cars with a selective door engine operating at constant speed. The general arrangement of this booth, and the display of old door engines made it very attractive.

Just across the aisle the Consolidated Car Heating Company showed its pneumatic door equipment and several types of heaters and heater controls. The special new offering here was a blast heaters with a silent blower in which the current to the heating element is automatically cut off when the motor is stopped. Other items were an improved thermostatic control, electric heater for cars and buses, a steam heater for buses and a safety switch panel for trolley buses.

The Gold Car Heating & Lighting Company featured three types of heating elements—open coil, low-voltage and high-voltage inclosed elements. The Electric Service Supplies Company had a complete line of Keystone car and bus equipment. Special attention was given to a working model of the Mueller-Evans bus heating and ventilating system, and a new ventilator.

Together with many of its standard products the Economy Electric Devices Company displayed the Superior trolley slide for city and interurban cars, and

a new lubricating paste for trolley wire. Railway Utility Company showed Chromalox strip heaters, heat regulators, ventilators and ground detectors.

The Johnson Fare Box Company displayed the new type of fare collection designed exclusively for the Twin Coach Company and installed in the Taxicoach. Other products of this company were an electrically operated fare box equipment, which had an instantaneous overhead registration, a Johnson "Universal Changer," and the Type D hand-operated registering fare box.

Several types of recording instruments and registers were displayed by the Ohmer Fare Register Company. These included the Vibracorder, which produces a complete seven-day record of the movement of any motor vehicle, and the Tachograf which records the running time and idle time, and also records the exact speed at which the bus was operated at any time. Other displays were a full line of Ohmer fare registers and ticket-printing registers.

The Perey Manufacturing Company featured in its exhibit the Coinpassor, a coin-controlled turnstile of the type installed on many of the Brooklyn Bus Corporation's buses. Several other types of turnstiles for street cars and for subway and elevated systems were also on display.

Latest developments in transfers designed primarily for use on one-man cars, and a complete line of samples covering all kinds of tickets in strips and bulk were shown by the Globe Ticket Company, along with ticket printing machines.

An extensive line of car seats and seating material may be cited as an example of the contribution of accessories manufacturers in improving the appearance and comfort of the transportation unit. Among special offerings of these exhibits were the reclining and semi-reclining models by Hale & Kilburn, reclining seats with aluminum alloy frames by S. Karpen & Brothers, and another very light seat with a magnesium alloy frame by the Kelton-Aurand Manufacturing Company. Other exhibitors of seats were the Art Rattan Works and Heywood-Wakefield.

Besides non-inflammable material for seats and curtains the Pantasote Company had something new in insulating headlining and wainscoting. Upholstered fabrics of the L. C. Chase Company comprised Velmo, mohair velvet, Leatherwove and other grades.

Upholstering leathers of all types were displayed by the General Leather Company. These included standard leathers as well as the new chrome leather known as Velvalea and Transitan.

Porcelain-enamelled stanchions, grab rails and seat handles in white and various colors were shown by the Ellcon Company. This exhibit included Ellcon fittings, special interior trim, chromium-plated and stainless steel.

The O. M. Edwards Company displayed quickly removable sash for street car and bus service, and similar sash in the drop type for the de luxe buses.

The Tuco Products Corporation showed Tucolith for car and bus flooring. In addition, roofing materials, and rockwool insulation, a light-weight fire-proof insulator with high sound-deadening qualities, were also on display.

BUS EXHIBITS IMPRESSIVE

Manufacturers of buses did a splendid job in their exhibits this year. The display of buses was felt by those who saw it to be undoubtedly the most impressive that has been held at any time, anywhere. It showed the most comprehensive selection of motor vehicles for the transportation industry, and forcefully brought home the fact that the design and production of the bus has reached a far higher plane than was evident at any previous exhibit. Many important trends in the design of the bus were noticeable.

It was apparent that manufacturers have paid a great deal of attention to body design and general harmony of appearance. Developments in body design in practically all types of buses for urban service have been made with a view to minimizing the time for loading and unloading of passengers. Wide doors and low step heights were in evidence. There was a noticeable trend toward the street car type of body and to the use of the center and off-center exit doors. Remarkable attractiveness of body appearance has been obtained by the greater use of streamline designs. Also significant is the emphasis that has been placed on the general reduction in weight per passenger. The use of all-steel bodies and the light alloys have brought about a general reduction in weight of practically all models. This trend, together with the development of more powerful engines, resulting in a higher ratio of horsepower to weight, is making practicable a steady increase in the capacity of buses.

This important tendency toward larger and larger capacity buses was accompanied by increasing attention to efficient and economical small-capacity units for light feeder lines and small properties. Several of these small-capacity buses were displayed, attracting the attention of many operators.

The street car type, 43-passenger bus was displayed as the latest addition to the Mack line. It is powered by a single 110-hp., six-cylinder engine and incorporates for the first time a Vickers hydraulic booster for power steering. This model has a 46-in. center-exit door and a front-entrance door of the same width. Mack also exhibited a 17-21-passenger light six. Besides the bus models, Mack had an interesting display of parts and running assemblies. A model of the hydraulic steering gear booster was shown in actual operation.

Much of the interest in the large exhibit of the General Motors Truck Company centered in a new 40-passenger all-metal bus, equipped with an engine of 150 hp. Considerable reduction in weight for this capacity has been obtained by the extensive use of aluminum alloys for the body members and frame sections. Departure from designs of Yellow buses was made in this model by the adoption of the street car type of body with an off-center exit door and the rear mounting of the engine. The engine is removable as a unit with the rear axle center. A new type of steering mechanism, used in this model for the first time, facilitates the handling of this large vehicle. Essentially, it consists of a worm sector pivoted on the axle with the shortest possible steering links to the steering arms. Seven other bus models, one of which was on the plaza, were displayed by General Motors, ranging in size from a 21-passenger parlor type to the 40-passenger bus just described.

SMALL BUSES ALSO SHOWN

One of the interesting displays in the low-capacity field was the Twin Coach Model 15, seating seventeen passengers. This is today the smallest capacity vehicle built by Twin Coach. It features a self-operating automatic clutch. This model might best be described as a miniature Twin Coach with a single engine. Twin Coach also showed a 40-passenger dual motor bus, similar to those purchased by the Brooklyn Bus Corporation, having a Perey turnstile for fare collection. The Taxi-Couch, in both urban and interurban types attracted considerable attention.

A newly developed center-exit bus and a new six-cylinder engine designed for special types of service featured the display of the White Company. Six buses, ranging in capacity from 20 to 40 passengers and a newly designed power repair truck comprised this company's exhibit. The new center-exit bus has a seating capacity of 33 passengers and the center door is treadle operated. The new engine, shown for the first time, is of the six-cylinder overhead type similar to the standard series of engines of the company. All models displayed were mounted on the new White-Bender steel underbody, developed to give rigidity and to protect against road twisting.

Together with the 40-passenger all-steel model, the American Car & Foundry Motors Company exhibited several parlor car and city types of buses. A large highway express tractor truck and the 175-hp. Hall-Scott engine were also on display. The 40-passenger bus has a front-entrance door just back of the front wheelhousing and an exit door at the rear, air-operated with electric control. This model is powered by a 120-hp. Hall-Scott engine.

Fargo Motor Corporation exhibited a 33-passenger street car type bus and two 21-passenger buses, one of the parlor car type and the other of the city type. A 29-passenger parlor-car type was also displayed. The 33-passenger all-metal bus was designed for circulating loads. It weighs 12,010 lb. complete on the road, or 364 lb. per passenger capacity. It is powered by a straight eight. All Fargo models featured low weight per passenger capacity.

Studebaker with a 25-passenger street car type bus and a chassis, and the Reo Motor Car Company made up the remaining bus exhibits. Reo exhibited a 21-25 passenger bus chassis of new design, a 25-passenger pay-enter city type bus, and a 21-passenger reclining seat bus with inside luggage rack. The new chassis is powered with a 101-hp. six-cylinder engine and has chrome-nickel cylinder blocks.

Displays of bus bodies were made by the Bender Body Company and the Wiener Body Company. Bender showed two skeleton city pay-enter bodies, one of composite construction and the other all metal. This unfinished display was made to illustrate the steel under-structure and the iron framing. The Wiener Body Company showed a 25-passenger body on a Model 54 White chassis and a 32-passenger semi-de luxe observation body on a Model 65-A White chassis. This company also had a collection of historical photographs showing advancement in bus body design since the early days of the industry.

Hercules Motors Corporation showed a series of six and four-cylinder engines completely equipped, and a complete line of Hercules parts. The Sterling Engine Company exhibited the Sterling Petrel bus and truck engine, rated at 150 hp. at 700 r.p.m. Also on display was the Sterling Viking eight-cylinder rail-car engine, the largest and most powerful engine of its type built.

In the line of bus accessories, many very interesting displays were made. Among these may be mentioned the display of automotive air brakes for buses and heavy-duty commercial vehicles by the Bendix Brake Company, together with air horns, signals and other air-operated accessories.

The Leece-Neville Company showed a complete line of automotive electrical equipment which included voltage-regulated electric generating systems used on present-day buses, comprising generators of various capacities and their respective control units. One system was on demonstration to show some of its many distinctive features.

A carburetor and spark adjusting machine, marketed under the name Casam, was the principal display of the Cities Service Company, which also included various grades of lubricating oils and greases. This machine was shown in the portable and stationary models. It detects and measures the

unburnt gases emerging from the exhaust line by picking up a sample of the exhaust gas and burning it to record the heat generated in terms of per cent of complete combustion.

A new development in a fuel supply system made its first appearance in the display of S.B.U. Pumps, Inc. It consisted of a gasoline pump, direct connected to a vapor and splashproof electric motor operated with battery current, and of automatic pressure and volume control valves built into the pump.

LATEST IN TROLLEY BUSES

Of interest to trolley bus operators were the displays of this type of vehicle on the Boardwalk and in the convention hall, and also the displays of overhead material by the Ohio Brass Company and the Westinghouse Electric & Manufacturing Company. Altogether, five trolley buses were exhibited. In addition to the two on the Plaza three trolley buses were on display in the auditorium.

Distinctive features of the new Yellow Coach 44-passenger trolley bus are the extensive use of aluminum alloys and the rear mounting of the motors. In addition, this model has a new centralized under-body control system, light alloy trolley poles, and a full blower system of ventilating all controllers, motors, compressors, etc.

The Brill trolley bus of 40-passenger capacity has a total weight of 18,260 lb. Its underframe and superstructure are of integral steel construction, and the underframe center sills, corresponding to automotive chassis framing, are deep channel steel pressings extending the full length of the vehicle. The body is spring mounted on Timken axles developed specially for trolley bus use. The motive power consists of two 50-hp. motors with a double worm gearing housed in the double-bowl rear axle. Each motor drives one wheel through its own propeller shaft and gearing.

The 40-passenger trolley bus built for the Memphis Street Railway by the St. Louis Car Company is equipped with two 50-hp. motors, air brake, pneumatically operated doors, with a treadle at the rear exit.

Together with the standard overhead equipment for electric car service, the Ohio Brass Company displayed a new improved line of overhead materials and equipment for trolley bus service. These included a new light-weight trolley bus base with a touring range indicator and overhead material for special work.

Westinghouse equipment for trolley bus overhead included an electrically operated frog, a molded feeder insulator, a ball-and-socket hanger, and the latest design of light-weight trolley base of welded structural steel shapes.

C. I. Earll showed a retriever designed especially for trolley bus service. Trolley bus equipment displayed by the General Electric Company in-

cluded a PCM control unit designed for handling two 50-hp. motors, a 10-ft. light-weight air compressor and a new pneumatic lap brake equipment.

TRACK DISPLAYS MANY

Among the new developments of the manufacturers of rails and special work was a new type of track construction jointly displayed by the Carnegie Steel Company and the Illinois Steel Company. The new GEO type of track, recently developed in Germany, differs from that generally used in America in the design of tie plate, method of fastening it to the tie and to the rail, and the use of a treated and compressed wood shim with each plate. These companies also exhibited a pair of rim-toughened wrought-steel wheels on short sections of steel cross-tie track.

Besides the Dardelet thread-lock bolts and nuts, the Bethlehem Steel Company also displayed frogs, mates and crossings of silico-manganese steel together with standard products such as a solid manganese switch and steel ties.

Another historical display was that of the Lorain Steel Company in which models of street railway trackwork which manufacturers were called on to make during the early development of the industry were exhibited, together with rails, switches, frogs and other trackwork of modern design. The Buda Company and the William Wharton Company showed their standard products in switches, mates and frogs. In addition, the Wharton Company showed frogs reconditioned by welding with Timang rods.

Instruments used in recording tread and flange contours of wheels in service, and various sizes of Naco spun-steel

car wheels were in the display of the National Malleable & Steel Castings Company.

Demonstration by the International Steel Tie Company of the "mortar flow" methods of placing concrete around all types of paved track with high-frequency vibration attracted many of the way engineers. To point out the results of this method of placing concrete, a section of paved track construction was cut away to show the Twin tie, and to show the bond between the steel and concrete. A new vibratory type screed for finishing concrete track paving and setting concrete in all types of construction was shown.

A layout to show the method of thermit-welding rail joints under traffic was the chief display of the Metal & Thermit Corporation. Rail-welding preheaters and rail clamps of the latest design and other improved apparatus for thermit welding were also included in this exhibit.

Several types of rail grinders were shown in operation by the Railway Track-Work Company. These included an improved high-speed rail grinder, the "Vulcan" rail joint grinder and the "Eureka" radial rail grinder. In addition this company showed an "Ajax" electric arc welder, "Ajax" trolley wire and several grades of grinding wheels and bricks.

Complete lines of rail bonds were displayed by the American Steel & Wire Company and the Electric Railway Improvement Company. In this class of equipment the Rail Joint Company showed base-supported continuous joints and reinforced joints adapted to the latest methods of welding. Seam welded rail joints were displayed by the Una

Welding & Bonding Company. In addition to the complete line of rail bonds, the Electric Railway Improvement Company showed auxiliary welding equipment and parts.

Transmission and distribution wire material for electric railway and trolley bus operation were the chief displays of the Bridgeport Brass Company. Included with these were samples of fittings of "Phono" and "Duronze" alloys as well as samples of copper-ground rods. The latter item is a new product by this company.

In the display of the Anaconda Wire & Cable Company, a specially designed catenary system with Hiteno trolley wire for the Pennsylvania Railroad and sections for other electrified railroads were featured. Non-ferrous Anaconda wire, cable and accessories were also shown. These items are designed to eliminate trouble caused by rust and vibration. Other displays of wire and cables were those of the American Steel & Wire Company and the Okonite-Callender Cable Company. The latter company displayed various types of impregnated paper cables, including Okonite-Callender super-tension cables and their joining accessories.

Ornamental fluted steel poles and the monotube strain and distribution poles, pole fittings and street lighting equipment were displayed by the Union Metal Manufacturing Company. The monotube poles are of cold-rolled open-hearth steel, making one-piece continuously tapered tubular poles, without horizontal joints.

Automatic block signals for interurbans and subways were featured by the Nachod and United States Signal Company.



An attractive transportation display once again filled Atlantic's City huge auditorium

Trend of REVENUES and EXPENSES

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Net Income \$*	Increase or Decrease Per Cent*
Boston Elevated Railway, Boston, Mass.											
Aug., 1930....	2,280,322	7.81	2,113,183	1.55	274,728	163.79	64,592	18.82	62,484	8.19	12,690
Sept.....	2,470,918	3.78	2,091,718	0.52	59,868	200.31	72,267	11.61	63,549	5.42	8,497
Oct.....	2,811,399	4.04	2,157,474	1.29	221,188	31.30	75,708	17.80	66,353	0.59	18,447
Nov.....	2,579,899	10.54	2,066,206	2.66	71,150	77.85	72,024	13.82	66,314	0.23	21,171
Dec.....	2,850,330	8.20	2,178,896	2.24	235,950	56.62	Jan., 1931....	79,764	15.78	67,438	7.98
Jan., 1931....	2,840,159	8.43	2,082,456	6.23	314,067	30.56	Feb.....	74,018	13.38	62,239	7.93
Feb.....	2,534,828	8.55	1,952,032	6.23	142,339	48.27	Mar.....	75,201	7.83	64,051	7.61
Mar.....	2,769,564	7.80	2,019,081	4.92	309,212	29.03	Apr.....	70,660	0.48	62,685	4.90
Apr.....	2,616,188	7.00	1,909,176	7.83	275,740	11.45	May.....	72,560	8.29	61,040	6.82
May.....	2,579,265	8.70	1,993,753	4.36	143,804	52.47	June....	63,338	13.81	59,346	9.15
June....	2,415,179	5.32	2,073,560	7.04	99,815	169.79	July....	58,406	4.11	59,429	7.33
July....	2,188,942	7.68	2,021,305	4.12	871,777	82.23	Aug.....	61,749	4.40	57,896	7.34
Aug.....	2,098,072	7.99	1,948,492	7.79	844,901	25.50					7,823
Brooklyn-Manhattan Transit System, New York, N. Y.											
Aug., 1930....	4,727,623	4.39	3,558,841	6.84	465,144	14.91	Aug., 1930....	47,425	11.42	28,402	8.19
Sept.....	4,834,251	2.49	3,453,431	4.52	667,323	6.20	Sept.....	42,823	16.49	28,052	14.83
Oct.....	5,036,775	2.58	3,572,553	4.22	758,817	2.78	Oct.....	38,032	11.56	27,266	6.85
Nov.....	4,769,083	4.37	3,366,923	6.98	689,470	2.34	Nov.....	36,974	12.49	44,183	9.58
Dec.....	5,065,484	2.56	3,346,963	4.25	814,788	2.04	Dec.....	36,166	15.00	27,949	1.79
Jan., 1931....	4,852,706	5.48	3,475,330	7.01	674,029	5.80	Jan., 1931....	33,291	20.15	25,057	9.18
Feb.....	4,453,655	3.79	3,159,903	5.96	583,468	2.40	Feb.....	32,281	19.80	22,990	9.64
Mar.....	5,028,562	2.56	3,475,847	3.37	814,360	4.13	Mar.....	32,904	22.33	24,732	14.69
Apr.....	4,969,481	2.09	3,458,940	3.35	804,235	0.25	Apr.....	34,729	16.98	24,132	11.98
May.....	5,056,779	3.31	3,438,037	4.51	913,877	1.64	Mey.....	39,889	12.63	24,992	11.61
June....	4,983,112	1.71	3,466,384	3.49	870,919	12.12	June....	116,770	57.67	.....	.....
July....	4,841,635	3.24	3,499,609	3.02	631,791	7.81	July....	116,819	49.64	.....	.....
Aug.....	4,582,572	3.27	3,419,932	3.90	423,123	9.03					
Brooklyn & Queens Transit System, New York, N. Y.											
Aug., 1930....	1,827,238	6.45	1,595,256	7.11	120,864	8.15	Aug., 1930....	244,033	12.41	177,452	10.89
Sept.....	1,887,499	4.66	1,564,271	5.65	213,728	2.65	Sept.....	251,919	9.00	175,905	10.42
Oct.....	1,922,388	6.20	1,597,166	5.60	214,924	7.74	Oct.....	267,306	7.57	181,499	10.67
Nov.....	1,820,498	5.65	1,522,735	7.58	187,822	5.20	Nov.....	247,210	10.00	176,739	1.96
Dec.....	1,920,463	4.40	1,560,950	6.11	250,893	6.06	Dec.....	258,219	9.84	180,678	0.68
Jan., 1931....	1,849,644	8.18	1,541,235	7.58	197,355	3.02	Jan., 1931....	242,554	10.62	176,792	11.08
Feb.....	1,704,677	3.88	1,416,192	5.40	176,217	2.58	Feb.....	223,256	14.11	163,249	12.96
Mar.....	1,941,078	1.98	1,602,862	2.58	227,472	1.21	Mar.....	244,396	10.97	170,067	12.70
Apr.....	1,911,878	1.29	1,592,919	3.11	208,514	6.86	Apr.....	.....	.....	.....	.....
May.....	1,980,118	2.50	1,585,293	1.85	286,334	7.89	May.....	.....	.....	.....	.....
June....	1,942,830	1.29	1,609,335	0.34	221,493	13.98	June....	222,528	10.09	159,897	10.71
July....	1,893,414	1.23	1,550,897	3.34	227,012	11.59	July....	214,241	13.29	158,175	10.50
Aug.....	1,849,792	1.23	1,574,167	1.82	142,067	17.54	Aug.....	404,721	30.72	.....	.....
Capital Traction Company, Washington, D. C.											
Aug., 1930....	314,513	3.48	268,561	4.09	16,103	2.62	Aug., 1930....	244,033	12.41	177,452	10.89
Sept.....	327,713	7.06	268,066	1.61	30,259	6.78	Sept.....	251,919	9.00	175,905	10.42
Oct.....	374,646	1.22	288,351	1.48	58,638	17.56	Oct.....	267,306	7.57	181,499	10.67
Nov.....	346,054	2.70	273,481	1.54	42,659	11.05	Nov.....	99,743	6.18	48,761	4.08
Dec.....	369,885	1.77	274,221	3.21	67,651	0.61	Dec.....	1,060,614	4.66	419,109	17.40
Jan., 1931....	347,491	3.05	280,514	3.30	37,705	5.11	Jan., 1931....	1,005,022	7.62	512,350	7.23
Feb.....	312,815	3.47	252,080	5.68	30,521	1.87	Feb.....	936,542	6.67	467,137	6.09
Mar.....	344,191	2.65	270,962	3.86	43,847	4.05	Mar.....	1,013,577	6.05	497,695	6.34
Apr.....	366,276	2.39	273,436	5.89	65,123	12.93	Apr.....	1,002,265	5.78	485,938	6.73
May.....	362,502	1.87	281,344	1.61	50,959	6.60	May.....	974,737	6.24	481,504	5.63
June....	351,017	3.05	276,751	1.84	45,841	12.14	June....	941,598	4.82	477,392	4.41
July....	306,826	0.10	258,341	1.58	9,438	91.25	July....	897,211	6.00	470,918	6.28
Aug.....	264,135	16.02	251,657	6.29	17,408	208.00	Aug.....	875,376	6.29	463,292	7.31
Chicago Surface Lines, Chicago, Ill.											
Aug., 1930....	4,488,146	12.20	3,796,705	8.06	680,219	15.82	Aug., 1930....	934,204	6.65	499,806	5.98
Sept.....	4,568,564	9.50	3,789,472	4.40	713,323	12.94	Sept.....	974,433	2.80	506,845	0.23
Oct.....	4,879,570	10.79	3,933,416	7.35	799,118	11.69	Oct.....	1,033,584	4.33	521,325	1.97
Nov.....	4,537,647	13.48	3,769,538	6.86	712,177	20.77	Nov.....	994,735	6.18	489,761	4.08
Dec.....	4,846,000	8.09	3,984,572	9.89	767,348	15.67	Dec.....	1,060,614	4.66	419,109	17.40
Jan., 1931....	4,576,133	12.65	3,825,964	5.37	718,129	21.00	Jan., 1931....	1,005,022	7.62	512,350	7.23
Feb.....	4,234,704	10.90	3,665,038	8.04	601,726	15.44	Feb.....	498,067	5.89	388,126	3.81
Mar.....	4,584,224	4.35	4,287,237	6.34	557,167	15.05	Mar.....	568,653	1.95	398,855	6.94
Apr.....	4,759,624	4.46	4,092,047	0.36	675,629	11.66	Apr.....	547,992	7.17	395,315	6.46
May.....	4,541,847	9.38	3,802,582	4.81	724,514	12.88	May.....	581,953	4.34	389,538	8.87
June....	4,348,896	8.76	3,629,943	5.36	664,122	14.51	June....	581,093	1.58	398,980	15.29
July....	4,093,702	9.74	3,579,566	5.98	580,118	10.55	July....	550,906	8.41	395,741	16.33
Aug.....	4,018,958	10.45	3,502,795	7.74	589,056	10.34	Aug.....	597,050	9.75	123,420	40.89
Department of Street Railways, Detroit, Mich.											
Aug., 1930....	1,516,209	29.02	1,426,941	16.67	52,773	119.46	Aug., 1930....	5,183,166	4.59	4,121,083	5.06
Sept.....	1,510,161	26.36	1,436,175	15.59	51,711	115.40	Sept.....	5,684,267	5.26	454,818	9.66
Oct.....	1,579,476	25.84	1,458,238	14.91	22,933	9.71	Oct.....	6,315,679	1.13	4,162,660	0.83
Nov.....	1,481,136	23.35	1,333,571	13.38	4,890	98.14	Nov.....	5,965,365	4.96	3,869,340	0.00
Dec.....	1,610,179	22.69	1,440,503	21.67	23,052	77.93	Dec.....	6,477,864	0.52	4,194,315	3.96
Jan., 1931....	1,550,656	28.54	1,421,575	20.95	12,759	91.44	Jan., 1931....	6,123,645	4.42	4,538,833	10.83
Feb.....	1,431,468	25.58	1,323,683	18.96	28,309	117.91	Feb.....	5,570,354	3.27	3,653,798	2.10
Mar.....	1,696,308	16.58	1,415,021	18.68	133,347	11.03	Mar.....	6,293,013	2.24	3,973,704	4.61
Apr.....	1,605,536	19.51	1,368,187	20.82	101,041	27.10	Apr.....	6,127,713	2.38	3,993,181	2.83
May.....	1,531,767	22.42	1,306,654	18.75	75,494	89.04	May.....	6,006,273	4.47	3,932,452	3.98
June....	1,416,647	20.71	1,302,075	15.86	34,977	121.99	June....	5,722,428	1.88	3,926,068	2.52
July....	1,256,741	18.89	1,243,831	14.38	144,112	24.41	July....	5,140,337	4.36	3,864,469	5.25
Aug.....	1,166,927	23.04	1,154,835	19.06	144,883	174.64	Aug.....	66,836	13.69	71,639	8.86
Eastern Massachusetts Street Railway, Boston, Mass.											

Trend of Revenues and Expenses by Months (*Concluded*)

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Kansas City Public Service Company, Kansas City, Mo.												
Aug., 1930....	622,554	18.17	530,094	11.41	15,479	64.11	495,723	442,076	.....	.....	3,643	.....
Sept.....	650,114	9.99	524,324	12.12	50,261	1.32	493,296	10.79	434,036	10.39	8,276	72.04
Oct.....	725,428	4.89	700,311	12.90	60,435	190.35	531,803	13.76	.....	.....	41,223	53.80
Nov.....	706,577	5.29	572,066	7.04	58,994	5.69	506,318	14.58	439,930	12.83	16,958	54.37
Dec.....	758,045	1.73	570,065	14.68	108,444	284.88	559,363	15.02	460,420	21.92	51,623	889.51
Jan., 1931....	711,215	6.52	577,741	12.67	61,108	132.10	543,940	15.39	493,596	12.94	372	95.68
Feb.....	640,676	6.87	537,583	9.72	27,392	149.06	482,566	14.30	437,444	13.02	4,503	150.71
Mar.....	216,637	2.58	577,319	7.25	66,013	72.81	524,299	10.44	480,958	9.38	6,233	865.73
Apr.....	709,515	0.68	565,328	6.23	71,298	99.32	510,645	9.39	470,964	7.60	9,992	455.80
May.....	701,286	2.37	562,482	7.66	64,474	114.33	509,278	10.84	474,803	7.52	15,021	168.13
June.....	655,957	0.17	540,187	6.23	42,677	683.20	482,703	9.40	438,362	8.15	4,633	201.09
July.....	613,628	3.19	533,084	9.23	6,643	119.18	462,601	10.24	436,574	4.84	22,069	502.72
Aug.....	600,311	3.57	518,559	2.18	6,122	247.05	445,932	10.15	420,929	4.78	23,467	744.17
Long Island Railroad, New York, N. Y.												
Aug., 1930... .	3,968,936	6.21	2,635,376	5.06	1,152,651	6.59	1,198,180	8.34	831,241	18.11	6,119	71.42
Sept.....	3,589,671	7.35	2,467,056	7.07	928,655	6.58	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.....	3,371,761	6.80	2,446,346	8.97	729,067	1.77	1,354,086	7.28	1,049,306	4.84	25,163	71.18
Nov.....	2,954,624	4.20	2,249,258	14.56	483,180	89.15	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.....	2,905,045	6.60	2,130,182	16.27	596,812	42.11	1,350,553	8.19	1,043,315	7.25	36,200	54.54
Jan., 1931....	2,263,421	5.65	2,210,263	9.85	321,141	6.00	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.....	2,361,169	7.45	2,074,216	9.13	332,002	3.86	1,136,604	15.78	891,421	16.97	24,088	251.15
Mar.....	2,841,915	3.09	2,234,418	9.00	449,501	24.64	1,262,429	14.90	981,026	14.76	12,212	84.94
Apr.....	2,976,402	4.69	2,269,029	7.37	533,425	1.97	1,253,764	13.50	966,424	13.56	11,440	82.93
May.....	3,212,765	4.00	2,338,313	8.03	695,032	9.93	1,256,334	13.78	991,107	11.93	2,206	96.99
June.....	3,414,354	6.78	2,351,016	7.26	907,010	5.76	1,195,126	10.29	963,857	7.59	34,952	198.96
July.....	3,629,561	9.69	2,594,463	2.75	783,315	32.75	1,105,980	10.55	946,646	1.86	117,591	918.99
Aug.....	3,513,473	11.48	.....	.....	.....	.....	1,038,314	15.34	947,614	1.76	180,963	3,057.40
Market Street Railway, San Francisco, Cal.												
Aug., 1930....	720,284	6.69	643,287	6.46	72,923	16.56	1,198,180	8.34	831,241	18.11	6,119	71.42
Sept.....	745,298	5.36	626,770	3.74	64,731	16.38	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.....	786,012	6.73	675,908	6.49	57,384	45.58	1,354,086	7.28	1,049,306	4.84	25,163	71.18
Nov.....	729,407	8.81	615,613	8.18	60,457	29.25	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.....	775,508	5.12	639,249	6.52	83,460	0.03	1,350,553	8.19	1,043,315	7.25	36,200	54.54
Jan., 1931....	738,092	6.56	641,519	4.83	45,011	12.31	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.....	668,931	8.17	576,661	8.22	41,002	7.29	1,136,604	15.78	891,421	16.97	24,088	251.15
Mar.....	757,960	6.40	633,346	6.81	72,828	0.05	1,262,429	14.90	981,026	14.76	12,212	84.94
Apr.....	745,252	6.72	620,106	7.06	73,837	3.46	1,253,764	13.50	966,424	13.56	11,440	82.93
May.....	733,105	7.50	619,934	8.21	62,805	2.08	1,256,334	13.78	991,107	11.93	2,206	96.99
June.....	704,769	6.19	654,225	1.75	37,384	11.82	1,195,126	10.29	963,857	7.59	34,952	198.96
July.....	700,996	4.68	598,082	7.97	52,186	60.40	1,105,980	10.55	946,646	1.86	117,591	918.99
Aug.....	726,480	6.69	607,925	6.60	68,175	6.51	1,038,314	15.34	947,614	1.76	180,963	3,057.40
New York, Westchester & Boston Railway, New York, N. Y.												
Aug., 1930....	196,405	10.53	152,180	0.41	184,982	22.45	1,198,180	8.34	831,241	18.11	6,119	71.42
Sept.....	203,617	8.18	165,256	6.57	192,861	29.53	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.....	202,046	7.52	138,192	14.09	190,748	20.81	1,354,086	7.28	1,049,306	4.84	25,163	71.18
Nov.....	184,690	8.74	170,542	2.52	216,151	19.75	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.....	190,136	12.31	138,592	17.80	205,029	16.75	1,350,553	8.19	1,043,315	7.25	36,200	54.54
Jan., 1931....	182,249	13.78	160,800	9.44	220,394	32.37	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.....	161,311	15.02	149,571	11.18	222,308	29.42	1,136,604	15.78	891,421	16.97	24,088	251.15
Mar.....	181,729	12.80	144,442	3.54	195,802	24.31	1,262,429	14.90	981,026	14.76	12,212	84.94
Apr.....	186,708	13.03	142,832	0.31	189,142	19.00	1,253,764	13.50	966,424	13.56	11,440	82.93
May.....	195,905	15.11	149,268	0.48	186,389	25.70	1,256,334	13.78	991,107	11.93	2,206	96.99
June.....	193,820	14.62	142,600	8.45	183,007	23.70	1,195,126	10.29	963,857	7.59	34,952	198.96
July.....	195,461	12.99	146,820	0.40	188,581	23.55	1,105,980	10.55	946,646	1.86	117,591	918.99
Aug.....	180,965	8.79	142,111	6.62	197,099	6.55	1,038,314	15.34	947,614	1.76	180,963	3,057.40
Northwestern Pacific Railroad, Sausalito, Cal.												
Aug., 1930....	638,476	11.48	415,502	18.84	210,115	4.03	1,198,180	8.34	831,241	18.11	6,119	71.42
Sept.....	548,282	8.68	471,657	3.78	16,471	83.57	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.....	555,867	18.49	534,858	4.44	7,447	95.22	1,354,086	7.28	1,049,306	4.84	25,163	71.18
Nov.....	333,193	27.74	421,712	16.33	97,567	120.85	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.....	312,319	20.77	465,220	3.48	158,491	74.63	1,350,553	8.19	1,043,315	7.25	36,200	54.54
Jan., 1931....	283,852	21.78	401,656	14.41	123,928	14.76	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.....	273,818	27.40	387,512	12.96	122,581	68.87	1,136,604	15.78	891,421	16.97	24,088	251.15
Mar.....	308,466	24.17	408,068	14.43	109,855	48.81	1,262,429	14.90	981,026	14.76	12,212	84.94
Apr.....	322,742	25.68	402,400	16.66	88,300	58.51	1,253,764	13.50	966,424	13.56	11,440	82.93
May.....	346,743	28.51	362,722	24.85	28,886	931.64	1,256,334	13.78	991,107	11.93	2,206	96.99
June.....	380,604	24.60	368,559	17.82	1,970	95.39	1,195,126	10.29	963,857	7.59	34,952	198.96
July.....	479,098	19.97	354,413	9.69	110,013	43.64	1,105,980	10.55	946,646	1.86	117,591	918.99
Aug.....	464,342	27.27	.....	.....	.....	.....	1,038,314	15.34	947,614	1.76	180,963	3,057.40
Statens Island Rapid Transit Company, New York, N. Y.												
Aug., 1930....	233,371	13.92	168,110	11.19	49,486	33.97	1,198,180	8.34	831,241	18.11	6,119	71.42
Sept.....	206,908	15.93	165,525	4.87	26,127	60.73	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.....	205,631	10.58	167,586	6.49	29,723	26.11	1,354,086	7.28	1,049,306	4.84	25,163	71.18
Nov.....	178,652	17.42	161,608	0.58	10,788	80.37	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.....	178,474	9.08	160,715	47.29	5,997	92.23	1,350,553	8.19	1,043,315	7.25	36,200	54.54
Jan., 1931....	120,387	9.58	158,982	6.35								

NEWS of the Industry

Improvement Projects

Montreal, Que.—During the current year, Montreal Tramways has spent nearly \$2,000,000 on capital account. Additional trackage has been laid, subways have been constructed and various improvements and additions have been made to existing equipment. A notable addition to bus equipment this year has been the purchase of twenty new buses of modern design. Of these, fifteen were supplied by Associated Equipment Company of Canada, and the remainder from the Leyland Company. An important piece of construction is the erection of a tunnel underneath the Lachine Canal, at a cost of \$2,500,000, to which the Montreal Tramways is pledged to contribute not more than \$825,000.

South Bend, Ind.—A street car route to serve the new residential and industrial development in the region of the Bendix Aviation Corporation offices and plants here was put in operation on Sept. 22. This route, formerly known as the Washington Street line, was extended to serve its enlarged territory and will hereafter be known as the Bendix Drive line, according to George R. Green, vice-president and general manager of the Northern Indiana Railway.

Chicago, Ill.—After five weeks of intensive preparation, the great Western Avenue substation of the Chicago Surface Lines recently was moved 17 ft. eastward from its original location. The work was accomplished successfully in thirteen hours, and the electrical machines were in operation throughout the course of the moving. Many novel engineering expedients developed in the course of the preparations, but the entire operation, including installation of the trolley wire feeder cables in permanent locations and the foundation and back filling work was completed in considerably less than the scheduled time.

Brooklyn, N. Y.—The Civic Council of Brooklyn has approved a substitute of the plan advanced last spring by the engineering department of the Board of Transportation for the easterly extension of the Fulton Street four-track subway beyond Alabama Avenue. The new route will continue beyond Truxton Street to Rockaway Boulevard in Queens, thence along Rockaway Boulevard to 120th Avenue and easterly to 120th Avenue, Queens.

Fare Changes

Youngstown, Ohio—Weekly bus and street car passes will be reduced from \$1.25 to \$1 on Oct. 18 by the Youngstown Municipal Railway. Several months ago, the rate was reduced from \$1.50.

Some Figures that Tell the Facts About Milwaukee

Figures made public for the first time since the new fare schedules went into effect on May 4, 1930, on the lines of the Milwaukee Electric Railway & Light Company show an increase of 0.02 per cent in gross passenger revenue for the first year under the pass and revised fares. The new rates went into effect at a time when all business was on the downward trend. Despite that, the Milwaukee company's metropolitan passenger revenue increased from \$8,562,696 to \$8,564,564. The gain was only \$1,868, but during the year unemployment increased in Milwaukee at least 20 per cent.

Since May 1, however, gross passenger revenue has been going down as the depression continues. For twelve months, ended Aug. 31, the gross revenue for the metropolitan area fell from \$8,571,210 in 1930 to \$8,375,930. The decrease was \$195,280, or 2.03 per cent. The figures for July, for instance, show a 5.1 per cent decrease in revenue.

The manner in which the company has held its own has brought many experts to Milwaukee to study its methods. The results of the first year of operation of the pass and new rates show that the city and suburban lines carried more passengers than the year before at a lower average rate of fare, and yet revenues held about stationary during severe economic depression.

The gross number of passengers carried during the twelve months from April 30, 1930, to April 30, 1931, was 196,394,472,

The Business Outlook

EVERYTHING now depends upon how far the administration's emergency efforts will restore public confidence, permit prompt pressure to be brought toward domestic re-inflation, and be supplemented as soon as possible by concerted international action. The securities and commodity markets are evidently still uncertain as to how thoroughly the deflation doctrine has been repudiated here and abroad, and how aggressively a reversal of the process will be carried out. Faced, further, with the prospect of continued unemployment, slack business, coming Congressional chaos, and prolonged political and financial instability abroad, they will probably be subject to extreme fluctuations for a considerable period. In the meantime, domestic business indicators show no definite turn for the better, but they still hold slightly above the bottom established by basic consumption requirements.

—*The Business Week.*

as compared to 180,756,845, an increase of 8.65 per cent. For the year ended Aug. 31, there was still an increase—193,617,873, as against 184,888,869, or 4.7 per cent.

For the year ending April 30, 1931, the distribution of riders was as follows:

Cash passengers dropped from 34,010,428, to 23,080,313, or 32.14 per cent, and ticket passengers from 92,457,048 to 26,367,445, or a drop of 71.48 per cent. Both the cash and ticket fare was increased on May 4, 1930. As against those figures, pass riders were 89,967,895, based upon a careful check showing that the

(Continued on Page 614)

Indiana Bus Bill Under Scrutiny

Another chapter has been written in the attempt to prevent publication as law by the Secretary of State of the so-called House Bill No. 6 when attorneys for citizens of Indianapolis and Muncie presented their oral arguments against the bill in Marion County Circuit Court. House Bill No. 6, as it stands, removes the control of all buses from the municipalities, and places it in the hands of the Public Service Commission. Plaintiffs contend that the act reached the office of the Secretary of State on the last night of the 1931 legislative session and was signed as a valid act of the Legislature without having been approved by the Senate. The Marion County grand jury has under way an investigation of the alleged irregularities in the bill's passage. A temporary injunction now restrains the Secretary of State from publishing the bill as a law.

Taxi Becomes a Menace

Business men have asked the City Council of Lincoln, Neb., to include in the new taxicab ordinance, now pending before it, a provision that the minimum fare shall be 15 cents. They base their plea entirely on the need of preserving service as furnished by the Lincoln Traction Company. Men out of work have put their cars into taxicab service, causing rate demoralization. In one instance a fleet of taxicabs is charging a uniform rate of 10 cents for the 5-mile ride to eastern and northeastern suburbs compared with the railway company rate of 12 cents. The communication sets out that the railway company probably could not for long survive this new competition. Fears are expressed that the company may seek to abandon its suburban lines. The proposed taxi ordinance requires meters for all cars, bans cruising and limits parking in downtown areas.

Bus Operations

Rome, Ga.—The Georgia Power Company has petitioned the City Commission to abandon its bus line route to Lindale through South Rome, and re-route the vehicles out Second Avenue and Maple Street to Lindale.

Rochester, N. Y.—The contract for use of bus routes of the New York State Railways in and between Rochester and Sodus Point, made on June 10, 1931, between W. T. Plumb and B. E. Tilton as receivers of the Rochester Railway and the New York State Railways and the Rochester Interurban Bus Line, Inc., has been approved by the Public Service Commission. The contract has also been approved by the United States District Court.

New York, N.Y.—Discussing operations of the Third Avenue Railway for the fiscal year ended June 30, last, Slaughter W. Huff, president, points out in the company's pamphlet report that the cost of bus operations during the year was reduced more than 4 cents a mile from the previous year, while receipts per bus-mile increased more than 1 cent. Substitution of buses for trolleys in Westchester is gradually taking place.

Houston, Tex.—The Houston Electric Company has been granted permission by Council to establish an express bus line to serve Southwood, between the I.G.N. tracks and Scott Street and Belmont, Grand Park and Foster Place additions, located just outside the city limits. The fare is to be 10 cents with transfer privileges.

Peoria, Ill.—The Illinois Power & Light Corporation will substitute trolley buses on certain routes here for trolley service, under authority of the Illinois Commerce Commission. Fares will remain unchanged. The seating capacity of the new buses will be larger than that of the street cars now in use. The amount of service will also be increased.

Sedalia, Mo.—The Public Service Commission has granted the City Light & Traction Company permission to substitute service by bus for its street car system.

Service Changes

Philadelphia, Pa.—Negotiations are in progress between the Delaware River Joint Commission and the Philadelphia Rapid Transit concerning the operation of the proposed line over the Delaware River Bridge. It is considered likely that the agreement with P.R.T. will be established on the basis of 3 cents for each passenger and that the fare on the line will be 10 cents. Officials have said it would be necessary to charge the same amount as passengers are now paying for a bus ride between Camden and Philadelphia. Engineers estimate that at least 65,000 persons will ride daily in high-speed electric trains when they are

in operation over the bridge. This figure is approximately 30 per cent of the 177,468 persons who crossed the river in buses, motor cars, ferries, horse-drawn vehicles and other means of transportation in a 24-hour period.

Chicago, Ill.—The City Council has adopted a resolution frowning upon the plan of the Chicago Surface Lines to place one-man cars on 26 routes. The request of the company for authority to use one-man cars is pending before the Illinois Commerce Commission. At a recent hearing on the request, William H. Sexton, corporation counsel, obtained a continuance of further hearings until he could ask the City Council to determine the city's policy on the matter.

La Crosse, Wis.—The city will likely oppose the petition of the Mississippi Valley Public Service Company to the Public Service Commission for a change in operating schedules of street cars and buses. The city feels that extra cars and buses should be put into service during rush hours of the day and evening. It has been suggested, that the company be permitted to abandon its car system on the 23rd Street line and substitute buses. The company petition requests: substitution of a fifteen-minute service on the north side line instead of present ten-minute service; substitution of fifteen-minute service on La Crosse Street-South Avenue bus line instead of the present twelve-minute schedule; and to discontinue operation of the 23rd Street line from 23rd Street to 4th and Main Streets, and substitute a fifteen-minute stub service.

Chicago, Ill.—Attorney Francis X. Busch, representing the Surface Lines, has served notice on the Illinois Commerce Commission that, if the one-man service is not allowed, the only alternative for the company will be the reduction in number of the two-man cars now in operation. The commission recently refused to issue a temporary order permitting one-man cars on certain designated cars, but authority from the commission is not needed to curtail service.

Wausau, Wis.—The Valley Transit Company, subsidiary of the Wisconsin Valley Electric Company, has withdrawn its petition with the Public Service Commission, in which it asked to be permitted to discontinue the bus service in Merrill. At a meeting of the company's officials and city officials, H. L. Geisse, vice-president, declared that the bus company has lost about \$30,000 since it started operation, but that the company

will endeavor, if it has the help of the people, to keep the line going for those who are constant riders. He asked citizens to suggest how the line can be operated without showing a loss.

Memphis, Tenn.—Thousands of visitors at the Mid-South Fair were permitted to inspect one of the new trolley buses of the Memphis Street Railway to be put in operation on the Lamar Avenue line about Oct. 15. R. N. Smith, "Operator No. 336," was in charge of the car all week. He will operate the new conveyance.

Kenosha, Wis.—The Metropolitan Motor Coach Company, Inc., which operated between Kenosha and the State line, has been authorized by the Public Service Commission of Wisconsin to abandon the route, which will be taken over by the North Shore Lines.

Financial News

Hammond, Ind.—H. K. Cuthbertson, of the Public Service Commission, has indicated that State approval will be given to the sale of the Calumet Railways, Inc., to the Insull interests to Walter J. Cummings. Mr. Cummings pledged at the hearing that he immediately will expend \$150,000 to rehabilitate the system should the commission rescind an abandonment order obtained this year and approve the sale.

Detroit, Mich.—The Detroit Motor Bus Company has agreed to accept the offer of \$616,000 made by the Department of Street Railways of the city for its real estate plant with the proviso that it buy all other properties as well. The D. S. R. had said it was willing to pay \$232,000 for a number of new coaches. The company agreed to this. The remainder, consisting of 400 coaches of varying age, plus plant machinery and other equipment, was valued by the company at \$2,345,476. E. Cyril Bevans, spokesman for the company, asserted that a fair appraisal of the bus company property showed \$3,378,000 to be its reasonable present market value." He charged that the appraisal conducted by the city has been haphazard and superficial.

St. Louis, Mo.—The decision in the case under which the wages of the employees of the St. Louis Public Service Company went to arbitration was rendered on Oct. 9 upholding the plea of the company to the extent of a 10 per cent reduction.

Toronto, Ont.—A friendly settlement has been reached between the city and the Toronto Hydro by which the latter agrees to pay local improvement taxes on Hydro properties. According to the Globe, if pressure is exerted to bring the Toronto Transportation Commission, operating the municipal railway and bus lines, into the same tax-paying class, the adjustment may not be so easy, since any considerable invasion of its surplus would, conceivably, result in increased fares.

(Continued on Page 613)

Coming Meetings

Oct. 12-19—Annual Safety Congress Including Special Electric Railway Section, Chicago, Ill.

Oct. 29-30—Annual Transportation Meeting of Society of Automotive Engineers, Washington, D. C.

Nov. 19-20—Middle Atlantic States Equipment Men's Association, York, Pa.

Jan. 27-29, 1932—Electric Railway Association of Equipment Men, Southern Properties, Richmond, Va.

Rescinding of Baltimore's Park Tax Discussed

Mayor Jackson, of Baltimore, has let it be known that he does not see how he can at this time favor the elimination of the park tax now paid to the city by the United Railways & Electric Company. The Mayor said, however, that he intends to suggest to President Storrs that as to any other relief to which the company may feel it is entitled, his company present its case to the City Council.

The law passed by the Maryland General Assembly, authorizing the Mayor and City Council to eliminate the park tax, also provides for them to grant a reduction in the tax, if the city cares to render partial relief.

Early in September Mr. Storrs discussed the whole subject in a letter to the Mayor, who now says he will reply to this letter within a few days.

At a session of the City Council held on Oct. 5 a resolution was introduced designed to place the Council on record as unalterably opposed to either the elimination or reduction sought. The resolution was referred to the Board of Estimates without discussion. So far no ordinance has been introduced dealing with the subject.

Not for a long time has anything occurred in Baltimore which has aroused so much public interest and discussion as the move made to either abolish or reduce the park tax. A number of the neighborhood improvement associations have passed resolutions opposing any change.

Cleveland Rates Modified

A compromise rate schedule, proposed by officials of the Cleveland Railway when city authorities objected to the double increase of fares within a week, has been approved by Cleveland, East Cleveland and Cleveland Heights City Councils.

For a trial period of 60 days, the railway will charge a 10-cent cash fare and 7½-cent ticket rate (four tickets for 30 cents) in the city of Cleveland with a 1-cent charge for transfers.

Fares for through rides to East Cleveland and Cleveland Heights will be 12 cents cash or 9 cents by tickets, with five tickets for 45 cents. A ride wholly within either municipality will be the same as the Cleveland fare.

The compromise schedule for a 60-day trial period was advanced when city authorities objected to the proposed increase from 8 to 9 cents cash fare on Oct. 4, and a boost from 9 to 10 cents cash fare on Oct. 11.

While the cash fare in Cleveland has been increased 2 cents, the ticket fare has been raised less than half a cent, to induce regular riding.

Mayor Wants Transportation Matter Settled

Mayor Miller of St. Louis, Mo., in a message to the Aldermen on Sept. 25 urged the board to "find an early answer to the vexing question" of mass transportation, pointing out that nearly \$35,000,000 in bonds and notes of the St. Louis Public Service Company will mature



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within the next three years. The Aldermen last spring retained former-Congressman Cleveland A. Newton to serve as special counsel in transportation matters. The Mayor said:

Through the report of the Transportation Survey Commission and an earlier report prepared by the city's then consulting engineer, C. E. Smith, your board is in possession of all the facts available on this subject. You have the benefit of the opinion of experts, arrived at after long and careful study, not only of the transportation question generally, but of those phases of it peculiar to our local situation. With the help of former-Congressman Newton, who has been specially employed for this purpose, it should not be difficult for your board to find an early answer to this vexing question.

Delay in finding such answer before the maturity of the bond issue and note and before the expiration of the present franchises a few years later, might seriously embarrass our car riders and St. Louis business interests. I earnestly recommend that your board devise a satisfactory plan for the solution of this transportation problem before the close of the present session.

Financial News

(Continued from Page 612)

Buffalo, N. Y.—The International Railway has brought suit to recover \$2,823, representing an alleged overpayment on its corporation income tax for the 1928 calendar year. After the payment of an original tax of \$87,656, the income tax bureau increased the tax liability to \$103,080. During the year 1928, the company purchased for retirement \$272,000, par value, bonds of the Buffalo Railway, the Crosstown Street

Railway, and the Buffalo & Niagara Falls Electric Railway for \$248,467. The company now disputes the validity of the order of the income tax department, requiring it to pay a tax on the profit on the bonds so retired.

Regulation and Legal

Columbus, Ohio—The State Utilities Commission has sustained its former order, rejecting a proposal of the Lake Shore Electric and others to cancel their joint tariffs with the "western chain" of Ohio interurban railways. The application to cancel the tariffs was filed to become effective Jan. 17, 1930, but the commission postponed the effective date and in its answer the "western chain" contended a monopoly would be established, should the proposal be approved. The "western chain" is comprised of the Dayton & Troy, Western Ohio Railway & Power, Findlay, Arcadia & Fostoria and the Fostoria & Fremont Railroad. As a result of the action just taken the joint tariffs will be continued in effect.

General

Baltimore, Md.—The Consolidated Gas, Electric Light & Power Company has announced the consummation of a twenty-year contract for power with the Pennsylvania Railroad covering the entire electrification requirements of the Pennsylvania system from the Susquehanna River at Havre de Grace, Md., to Washington. Power for this line will be supplied early in 1933.

Jacksonville, Fla.—Members of the City Council's special franchise committee are said to look with favor upon alternative proposals made by the Jacksonville Traction Company for a new franchise to replace the one under which that firm now operates but which expires next January. Under terms of the new proposal the company asks for a net return of 8 per cent upon a capital investment of \$2,500,000, and offers to pay a 3 per cent gross tax to the city out of surplus returns over 8 per cent net to the company.

Detroit, Mich.—The Miller-Schorn plan advanced for stimulating street car riding here will go on the ballot at the election next month. Last spring a plan of between-tracks safety depots and associated subwalks in combination with express street car and local bus service was lined up for submission to the people, but the matter did not appear on the spring ballot under promise that the plan would appear at the fall election. Within the last two weeks 49,000 signatures were secured requesting that the matter be placed on the ballot, with but 25,228 signatures actually required. The City Clerk has since certified to the Common Council that more than the necessary signatures had been supplied for this proposition to be placed before the people on Nov. 3.

Results in British Columbia

A reduction of nearly 2,000,000 passengers for the year as compared with the previous year's operations was revealed in the annual report of the British Columbia Power Corporation, controlling the British Columbia Electric Railway and subsidiary companies. Slowing up in the building trade and condition of the lumber business, two important industries centered in Vancouver, are largely responsible for the decline in the number of passengers carried. Car mileage increased 561,000 over the previous year due largely to the increased number of cars in service during rush hours. Freight revenue, being largely dependent on the movement of transcontinental freight showed a heavy decline. In a five-year survey the report shows:

	Passengers Carried	Freight Tonnage
1931.....	74,249,659	343,320
1930.....	76,113,515	454,111
1929.....	77,694,731	553,391
1928.....	77,063,656	487,890
1927.....	75,113,022	481,699

Facts About Milwaukee

(Continued from Page 611)

average passholder gets 22 rides per pass. Transfer rides on the pass were 36,803,271 at the rate of nine transfers per weekly pass. Transfers during the same time dropped from 54,289,369 to 20,175,548, due to the decrease in cash and ticket riding and the popularity of the pass.

Under the unusual efforts made through various types of cut-rate passes, riding increased by 25,000 to 30,000 passengers a day. Peak-hour riding, however, decreased by about 31,000 passengers a day, but the off-peak riding has increased by 56,000 to 61,000 passengers daily. Short-haul riding in the downtown and outlying districts has been stimulated through the pass and more liberal transfer privileges.

The company estimates that 67 per cent of its riding is by the pass and that the average fare on the pass now is 4.55 cents a ride. Figuring that 16 per cent of its passengers pay cash, and 17 per cent buy tickets, it points out that the average fare now is 6.1 cents a ride as against 6.76 cents before May 4, 1930.

The commission's prediction that the new fares would give the utility \$400,000 in additional revenue has not materialized. In anticipation of the theoretical increase, electric light rates to residential and small commercial users were reduced \$482,000 as an offset. The reductions in the rates for electricity will, however, remain in effect.

The coming of the pass has helped to increase the car speed in Milwaukee's metropolitan area from 9.261 m.p.h. to 9.733 m.p.h. the first year and to 9.86 m.p.h. at present. Prior to the pass, car speed was slowing up. The time consumed by the trainman now in handling cash, tickets, etc., is 60 per cent less than formerly. Nearly 78 per cent of the evening rush-hour rides require no fare handling.

It is also pointed out that in 1926 6 per cent of the metropolitan area was more than one-quarter mile from a street car or bus line while now only 3.2 per cent of the area is in that category.

Foreign News

British Railroads Hostile to Electrification Report

Proposals made in the report of the Weir committee on main-line electrification have been submitted by the Government to the railroads, but there appears to be no likelihood of a reply calculated to lead to early action on the lines suggested by the committee. In the present financial position of the companies, even with a large measure of Government assistance, an expenditure of \$1,305,000,000 spread over a number of years, requires very serious consideration, and the reports received by the railroads from their experts are likely to induce the general managers to approach main-line electrification cautiously.

During the present period of depression the possibility of a combine to include the main-line railways and their competitors has been broached, but opposition to any such plan remains strong.

So far the railroads have not yet replied to the Government's request to furnish their observations upon the Weir report, but it is known that they are definitely against it. Even taking the figures put forward by the committee, which may be regarded as showing the case for electrification in a favorable light, the feeling is that the companies would not be justified in contemplating the expenditure of so large a sum, in view of the way in which their traffic receipts are shrinking.

Suburban electrification, however, stands on a different footing. Here the committee estimates that there will be a return of 13 per cent on a capital expenditure of \$225,000,000. This is a far less speculative proposition, especially in view of the agreement under which the suburban lines will be included in the London traffic pool. When the London Passenger Transport Bill is passed into law much is likely to be heard about suburban-line electrification.

Trolley Bus Progresses in England

The extensions of the trolley bus system on the routes of the London United Tramways, described recently in ELECTRIC RAILWAY JOURNAL, are now nearing completion. In Nottingham the Corporation has ordered thirteen trolley buses, while Chesterfield Corporation has two such buses on order.

New Subway Traffic Record set Up in London

A subway traffic record of more than 30 years' standing was broken in London recently, when more than 300,000 people attended the Royal Air Force Pageant at Colindale. The number of passengers arriving at the Colindale Station of the London Underground Railway during the day was 108,000, or 10,000 more than last year and the highest number ever handled at any subway station on a single day. If allowance is made for the huge crowds of people arriving at Hendon and Burnt Oak stations (close to Colindale) for the pageant, the total number of those

traveling in the two directions during the day would be not less than 250,000. The previous subway traffic record was made 30 years ago at the Bank Station of the Central London Railway on the occasion of the celebration of the return of the City Imperial Volunteers after the South African War. Although this record has been approached on several occasions, it had never been broken before.

Bow Collectors for Glasgow

The Glasgow Corporation Transport Department has decided to fit all its street cars with a new type of overhead collector. The invention of Fischer de Tovaros, consulting electrical engineer to the Budapest City Tramways. The Fischer bow collector takes the form of a special steel plate, 39 in. long by 4 in. wide, with grooves 24 in. long by $\frac{1}{2}$ in. wide and $\frac{1}{4}$ in. deep, filled with grease, which reduces wear, minimizes breakage, and prevents the formation of ice. At terminals reversal of the collector is automatic. The collector is almost noiseless in operation, is completely free from sparking, whistling and vibration, and causes no interference to radio reception. The Glasgow authorities began experimenting with the Fischer bow five years ago, when eight cars were so equipped. Birmingham, Aberdeen and several other cities are also trying the device.

Electrification of Russian Railroads

The work of electrifying new railroad lines in the U.S.S.R. was recently begun. In the Urals operations are in progress on the Lunevsk branch carrying coal from the Kizel Basin. This branch will be electrified for a distance of 113 km. Work has already begun in the Lenigrad-Oranienbaum district with a branch to Gatchina, and on the Mineralnye Vody branch, in the Caucasus, from Mineralnye Vody Station to Kislovodsk. The length of each of these electrified branches will be 72 km. The first Soviet electric engines will be built at the Kolomna factory in the Moscow region.

London, England—In spite of the prospect that the London County Council tramways may be transferred to the proposed Transport Board, the County Council continues its schemes of improvement. E. Sanger, chairman of the Council, recently recalled that the subway between Victoria Embankment and Southampton Row, which formerly could take only single-deck cars, was reopened for traffic on Jan. 14 last after it had been rebuilt to accommodate double-deck cars. The stations on the subway were modernized and an improved scheme of lighting was installed. At the tramway power station in Greenwich a new and more economical plant of increased capacity is being substituted for old plant at an estimated cost of £450,000. Arrangements have been made for modernizing the fleet of trams and for anticipating future demands.

Lanarkshire, Scotland—The tramway routes of the Lanarkshire Transport Company have ceased operation. Service by bus has been substituted.

PERSONAL MENTION

G. D. McGwinn Succeeds Colonel J. H. Alexander

Announcement was made in Cleveland, Ohio, on Oct. 7 of the election of George D. McGwinn as president of the Cleveland Railway to succeed Joseph H. Alexander, resigned. Mr. McGwinn has been a vice-president of the company since last May when the Van Sweringen interests became active in the affairs of the company through the placing of C. L. Bradley, Alva Bradley, Col. Otto Miller and Mr. McGwinn in executive posts with the railway.

Colonel Alexander said he planned to remain in Cleveland and establish an office as a railway consultant. In his letter of resignation he said:

I have for some time been giving consideration to the severance of my connection with the Cleveland Railway before the expiration of my present term. For a variety of reasons, with which the chairman is familiar, permit me herewith to tender my resignation as director, member of the Executive Committee and president, effective immediately.

No indication is contained in the account of the change in the Cleveland *Plain Dealer* that an official statement regarding the matter was made by the management, but that paper did pay a gracious compliment to both men in an editorial which it concluded in part as follows:

The substitution of George McGwinn for Joseph H. Alexander in the president's chair was not unexpected. So far as the administrative direction of the company goes it means little. To many, the departure of Colonel Alexander from an enterprise with which he has been connected since the days of Tom L. Johnson brings a pang of regret. He has had an important part in giving this city what, in spite of its present woes, is one of the best electric railway systems in America. His successor has a record of administrative achievement which justifies the esteem in which he is held both by his employers and by the community.

From the time of his graduation from the Case School of Applied Science with a degree in mechanical engineering in 1905, with the exception of service as assistant to the general manager of the Pittsburgh Railways for a few years, and absence from duty with the engineering forces during the War, Colonel Alexander's activities have been confined to the local transportation system in Cleveland. Immediately following his graduation from the Case School, he took a position as chief engineer with Tom Johnson's Municipal Traction Company in that city, and in the bitter struggle for supremacy between rival street railway interests which kept the city in a turmoil for the next four or five years Mr. Alexander fought shoulder to shoulder with his chief. The outcome of that battle was the Tayler franchise, a model of its sort, under which the Cleveland properties have operated with conspicuous success ever since.

Following his experience in Pittsburgh Colonel Alexander returned to Cleveland as chief engineer in the office of Peter Witt, at that time the city's transit commissioner, where he rendered exceptional service in assisting to solve the local transportation problems. In this capacity he



G. D. McGwinn

attracted the attention of the late John J. Stanley, the doughty president of the Cleveland Railway, who engaged his services in 1916 as assistant to the president. Responding shortly afterwards to the nation's call to arms he received an appointment as major in the administrative section of the construction division of the army, being presently advanced to the rank of colonel. Under his general direction at one time were the labors of nearly 400,000 men engaged on contracts involving the expenditure of approximately \$1,500,000.

Returning to his job at Cleveland he was elevated to the vice-presidency of his company, which office he filled until the death of Mr. Stanley in October, 1926, when he succeeded to the presidency.

In addition to his official duties, Colonel Alexander has found time to take an active part in the affairs of the A.E.R.A., of which he is now first vice-president, as well as to take part in many local activities in the city of Cleveland. Among other honors which have been bestowed upon him have been the presidency of the Cleveland Engineering Society, the presidency of the Cleveland Safety Council and the presidency of the Ohio Safety Council.

Mr. McGwinn went into electric railway



Col. J. H. Alexander

operation in Cleveland more than a year ago through the channels of building management and construction. He had previously been a specialist in building management. Among the structures of which he was in charge were the Citizens' and the Union Commerce National Bank buildings in Cleveland. When the Union Trust merger was brought about, Mr. McGwinn was confronted with the problem of housing the forces of four banks in a building that was considered too small for one. He managed it for three years, while the Union Trust building was under construction, and then was made vice-president and building manager of the Union Trust Company.

Veteran Cincinnati Employee Honored

More than twenty-five executives and operating officials of the Cincinnati Street Railway, Cincinnati, Ohio, assembled on Sept. 15 at the Gibson Hotel to honor F. J. Venning, superintendent of power, on the occasion of his 70th birthday. The affair was a surprise to Mr. Venning, who had a luncheon engagement with his general manager, J. B. Stewart, Jr., to go over various company matters. Instead of going to the dining room on their arrival at the hotel, Mr. Stewart piloted the way to one of the private dining rooms, in which were assembled his fellow associates, headed by Walter A. Draper, president of the railway.

Rounding out 51 years of service in the electrical business, Mr. Venning's first work in electrification of horse cars was in Savannah, Ga., in 1890, when he installed the first railway motor installed by the Westinghouse company. Prior to this time, he was employed by the Pennsylvania Railroad as a fireman, then as an engineer. In 1889 he joined the Westinghouse company, installing electric motors. In 1893 he joined the Citizens' Traction Company of Pittsburgh, where he remained until 1910, when he entered the service of the Cincinnati Street Railway. On March 1, 1918, Mr. Venning was appointed superintendent of overhead lines and two years later took over the superintendence of shops and equipment. On Feb. 1, 1926, he was appointed superintendent of power, which position he holds at the present time.

John F. Collins Made Receiver at Saginaw

John F. Collins, Jackson, Mich., has been appointed receiver for the Saginaw Transit Company, Saginaw, Mich., by Judge Tuttle in the United States District Court. The Saginaw Transit Company operates street cars and buses in Saginaw as well as a short interurban line to Zilwaukee.

Approximately 200 miles of railroad are now operated by Mr. Collins. The systems included under his direction are: the Lansing Transportation Company, the Jackson Transportation Company, the Battle Creek Transportation Company, the Kalamazoo Transportation Company, the Saginaw Transit Company, and the Eastern Michigan-Toledo Railroad, of which he is the receiver.

C. O. Guernsey Directs Brill Engineering Activities

All Brill engineering activities have been placed under the direction of Charles O. Guernsey as chief engineer of the J. G. Brill Company and its subsidiary companies.

Mr. Guernsey has been connected with the Brill organization since 1923. During his association with Brill he has taken a keen interest in the modern trend in the design of electric railway rolling stock and other types of urban and interurban transportation equipment. The rapidly increasing prominence of the trolley bus as a factor in the public passenger transportation field resulted in Mr. Guernsey's appointment as chief automotive engineer on Jan. 1 last. Subsequently, the apparently successful application of worm and other modern type drives to electric car trucks, streamline body design and other similarly modern practices resulted in the unification of all Brill engineering activities under Mr. Guernsey's direction. He will be located at the Philadelphia plant.

For ten years before he joined the Brill organization, Mr. Guernsey was affiliated with the Service Motor Truck Company, Wabash, Ind., as chief engineer and later as vice-president in charge of the company's railroad division, the activities of which were transferred to the Brill Company in 1923 at which time Mr. Guernsey was appointed chief engineer, automotive car division. Under his direction the extensive line of Brill rail motor cars for steam railroads was developed.

Herbert Morrison Withdraws as Transport Minister

Herbert Morrison, Minister of Transport in the English Labor Government, has declined to carry on under the new National Government. He was practically the promoter of the London passenger transport bill, intended to promote the co-ordination of the London passenger services. Even the motor transport people were quick to recognize the service Mr. Morrison has performed, and to express regret at his decision not to throw in his lot with the newly formed National Government. A contemporary in that field says:

The decision is all the more important in view of the announcement that the London passenger transport bill will be proceeded with as an agreed measure. Whatever the future may hold for Mr. Morrison and his party, we shall always be grateful to him for having put real life into the Ministry of Transport. He has displayed a practical appreciation of the industry's point of view, and thus ensured its co-operation in the important measures which have marked his spell of office. Mr. Morrison will certainly be remembered as one of the most successful Ministers of Transport.

A. V. Guillou With Wisconsin Commission

A. V. Guillou, for 4½ years assistant chief engineer for the California Railroad Commission, has resigned to become chief engineer of the newly reorganized Public Service Commission of Wisconsin. Prior to his connection with the California Commission, Mr. Guillou was associated with a number of California power companies. After

his graduation from the University of California in 1912, he spent two years with the Westinghouse Electric & Manufacturing Company in East Pittsburgh, and then joined the Pacific Light & Power Corporation, later merged with the Southern California Edison Company as commercial salesman. Later he became district manager for the Mount Whitney Power & Electric Company. When that company was taken over by the Edison Company in 1919.

Department of Overseas Trade, has been appointed Parliamentary Secretary to the Ministry of Transport, in succession to J. A. Parkinson, Labor member for Wigan. Mr. Pybus is a member of the Institution of Electrical Engineers. In 1917 he was created a C.B.E. for his services to the Ministry of Munitions during the war. He has been a member of various government commissions and committees.

Charles H. Forsgard, who has been acting general manager of the Community Traction Company in Toledo for nearly four years, has been made vice-president and general manager and elected a director of the company. Overwhelming approval of the ten-year extension of the service-at-cost ordinance by the electorate was taken partially as a compliment to Mr. Forsgard for the many operating improvements and economies together with unification of bus and street railway service under his guidance.

P. J. Pybus Minister of Transport

P. J. Pybus, Liberal member of Parliament for Harwich, has been appointed British Minister of Transport. Mr. Pybus is a well-known business man, and is a director of the English Electric and other companies. G. M. Gillett, Labor member of Parliament for Finsbury who, in the last government, was secretary to the

W. B. Wheeler Made Superintendent of Transportation



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W. B. Wheeler

William B. Wheeler, who has had a long, practical and successful career in street railway work in the Metropolitan District of New York, has been advanced to superintendent of transportation of the trolley and bus lines of the Third Avenue Railway System, New York.

With very little opportunity for formal schooling in his formative years, and with no personal influence back of him, Mr. Wheeler has fought his way up through all the stages, educating himself as he went along and winning promotion by deserving promotion. His many friends who have recognized his sterling qualities, his indomitable ambition and his determination to make good are expressing their gratification at this latest recognition of Mr. Wheeler's abilities, not only on his account, important as that is, but because of the message of encouragement which that recognition carries to other men in the ranks.

Even to his superiors, the intensity of the man has been a source of wonder. Mr. Wheeler has found time for other activities, some collateral with the street railway enterprise. He took an active part

in the affairs of the Metropolitan Section of the A.E.R.A., and was president of that organization. He has been for a number of years on the board of fire commissioners in New Rochelle where he makes his home. He has also served as president of the Republican Club in New Rochelle.

Mr. Wheeler was born in Brooklyn on Oct. 13, 1873. He received his early education in the public schools of that city. The training was brief, however, as at the age of twelve, upon the death of his father, he was obliged to go to work to help support the members of his family. Later he engaged in the photographic business with success, only to see this enterprise go on the rocks in the panic of 1894. But he was not to be dissuaded. He again began at the bottom as a conductor on the Atlantic Avenue Railroad in Brooklyn, determined to make street railway transportation his life work. He was attracted by the opportunities offered in Manhattan by the Metropolitan Street Railway System, and became in time a conductor on the Broadway cable line. A few years later he became a starter at the Lenox Avenue Depot.

So he continued to advance up through the various grades, educating himself in the various collateral lines, until he became general superintendent of the Westchester Electric Railroad, operating trolley lines in New Rochelle and Mount Vernon. He was holding this position in 1919 when President Huff of the Third Avenue Railway System commissioned Superintendent William E. Thompson to reorganize the transportation department. In this reorganization Mr. Wheeler was selected first as superintendent of schedules and later as assistant superintendent of transportation. This position he has filled successfully for a number of years, and upon the relinquishing of the active duties of the transportation department by Vice-President Thompson, he became the active head of the department as superintendent of transportation.

Many Promotions Made by Penn-Ohio System

William Muldoon to Fill New Position of General Superintendent—Added Responsibilities for Messrs. Brackett, Weller, Giltner, McKenna and Shaner

THE new position of general superintendent of the Penn-Ohio Transportation System, comprising electric railway and bus service in Youngstown and Warren, Ohio, and New Castle and Sharon, Pa., and connecting those cities, has been filled by the appointment of William Muldoon. As general superintendent, he will have direct charge of the operating, maintenance of way and maintenance of equipment departments.

When the service-at-cost franchise was adopted for the city railway and bus operation in Youngstown in January, 1919, Mr. Muldoon was selected by William L. Sause,

and interurban lines connecting those cities and also Warren, Niles and Leavittsburg, Ohio. Mr. Brackett went to Youngstown in 1916 as dispatcher for the Youngstown Municipal Railway following nine years as dispatcher and inspector at Houston, Tex. He was placed in charge of the Haselton carhouse, Youngstown, as foreman in 1918, and was promoted to general shop foreman in January, 1923. Four years later he was promoted to assistant superintendent of equipment, a position in which he has continued up to the present.

Perry R. Weller has been appointed superintendent of automotive equipment



1. G. E. McKenna
2. William Muldoon

3. A. D. Brackett
4. P. R. Weller

5. J. W. Giltner
6. C. H. Shaner

Youngstown's first street railway commissioner, as his assistant, and he continued in that post until the present time, having intimate connection with the operation and development of the Youngstown lines. Prior to entering the commissioner's office, Mr. Muldoon was deputy clerk of the Youngstown City Council for ten years. Before he was employed in the offices of the Wabash Railroad in Chicago and of the Pennsylvania Railroad in Youngstown.

A. D. Brackett, for more than four years assistant superintendent of equipment, has been appointed superintendent of car equipment of the Penn-Ohio System, comprising electric railway lines in Youngstown, Ohio, New Castle and Sharon, Pa.,

of the Youngstown Municipal Railway and affiliated companies of the Penn-Ohio System, with headquarters in Youngstown. Mr. Weller has been connected with the company since April, 1925, prior to which he was with the service department of the Buick Motor Company at Indianapolis. He entered the employ of the Penn-Ohio in charge of cost control in the maintenance of way department. In 1926 he was made statistician and research engineer in the commercial department, and two years later was appointed general foreman of the Mahoning Avenue garage, Youngstown. He continued in that position till his promotion to superintendent of automotive equipment for the system.

J. W. Giltner, for the last ten years

chief claim agent for the transportation companies centering on Akron, Ohio, has been appointed general claim agent of the Penn-Ohio Transportation System with headquarters in Youngstown. In his new position Mr. Giltner has charge of the claim departments of the Youngstown Municipal Railway, the West End Traction Company, the East End Traction Company, the New Castle Electric Street Railway, the Shenango Valley Traction Company, Penn-Ohio Coach Lines Company and affiliated transportation companies serving Youngstown, Warren and Niles, Ohio, and New Castle and Sharon, Pa., and connecting those places.

Mr. Giltner's connection with the electric railway industry dates from 1907 when he joined the claim department of the Indiana Union Traction Company, Anderson, Ind. Subsequently he was assistant chief claim agent for the Portland Railway, Light & Power Company, Portland, Ore., assistant chief of the adjustment bureau of the associated bureaus of the Pittsburgh Railways, and superintendent of the Pittsburgh claim department of the London Guaranty & Accident Company, Ltd. In May, 1918, Mr. Giltner went to Akron as assistant chief claim agent of the Northern Ohio Traction & Light Company, and three years later became chief claim agent, continuing in that post till his appointment to the Youngstown properties.

George E. McKenna has been promoted from assistant chief claim agent to chief claim agent of the Akron Transportation Company, Northern Ohio Interurban Company and Penn-Ohio Coach Lines Company, Akron, to succeed J. W. Giltner. Mr. McKenna has been assistant chief claim agent at Akron since March 15, 1922. He entered railway claim work in Buffalo, N. Y., in 1913 and continued in that work in Buffalo and in New York City for four years. Following eighteen months' service in the U. S. Marine Corps during the World War, he went to Akron and entered the claim department of the Northern Ohio Traction & Light Company in September, 1920.

C. Howard Shaner has been appointed safety supervisor of the Akron Transportation Company, Northern Ohio Interurban Company and Penn-Ohio Coach Lines Company, Akron, succeeding Glenn H. Shaw, who has been appointed director of safety of Ohio Edison Company. Mr. Shaner continues as safety supervisor of the Youngstown Municipal Railway and other companies with headquarters in Youngstown, Ohio, where he has been supervisor of the accident prevention work since Sept. 1, 1922.

During this period these companies, comprising the Penn-Ohio System, have won highest national awards three times, the Charles A. Coffin gold medal for the system in 1926, the Anthony N. Brady gold medal for the system for 1927 and the Coffin gold medal again for the Youngstown Municipal Railway in 1930.

Mr. Shaner entered railway work as a trainman for the Pittsburgh, McKeesport & Connellsville Railway in McKeesport in 1902. He went to Youngstown as a street car operator in 1909, and was selected as safety supervisor of the Youngstown Municipal Railway in 1922. Soon thereafter, however, his duties were enlarged to include the entire Penn-Ohio System.

J. W. Maxwell Heads Seattle Commission

The Municipal Railway Commission at Seattle, Wash., has chosen J. W. Maxwell, vice-president of the National Bank of Commerce, as chairman of the commission which will undertake to outline a program for operating the municipal railway. The Commission has been assured by Mayor Harlin and the City Council that it will have a free hand in its endeavors, and in the appointment of a railway manager. The commission has established offices in the City-County Building, and invites suggestions from citizens. Under the present provisions of the city charter, the commission can act only as advisers to the City Council.

In accordance with the Council resolution creating the commission, its members drew lots to determine the length of their respective terms. A. A. Murphy drew the one-year term; Rowland W. Watson, the two-year term; Mr. Maxwell, the three-year term; Charles P. Moriarity, the four-year term, and N. D. Moore, the five year term. Succeeding appointments will be made by the Mayor for five years.

H. W. Olcott, Jr., long connected with the Insull interests in publicity and advertising work in Chicago, South Bend and Indianapolis, has resigned from the Interstate Public Service Company to join his father in the insurance brokerage business in New York. At Indianapolis he was manager of publicity and advertising for the Interstate and other companies. Mr. Olcott wrote on his chosen subjects in a sprightly manner, but one that reflected a thorough knowledge of the topics he discussed, and that carried conviction. For more than five years he was a contributor to *ELECTRIC RAILWAY JOURNAL*.

Arthur G. Kjellgren, for the past nineteen years employed by the Rockford Traction Company, Rockford, Ill., has been appointed general superintendent of transportation for the Central Illinois Electric & Gas Company, a position newly established further to co-ordinate the various departments of the company under one direction. He has recently been trammaster in charge of all interurban cars and buses.

Thomas N. McCarter, president of the Public Service Corporation of New Jersey and a brother of the late Uzal H. McCarter, long president of the Fidelity Union Trust Company, Newark, has been made chairman of the Executive Committee of the bank, a new post.

Lawrence B. Sizer has been appointed to the position in advertising and publicity work for the Insull interests at Indianapolis held by H. W. Olcott, Jr. Mr. Sizer has been engaged in utility publicity work for about three years. He has had well-rounded experience in newspaper work, climaxed by a term as sports editor of the Benton Harbor (Mich.) *News-Palladium*. That in itself is severe training, for sports recording must be done with gusto and accuracy. Every reader of the news of sports has his heroes. And the way of the writer who does any of these heroes even a seeming injustice is not easy.

OBITUARY

Thomas Scott

Thomas Scott, general roadmaster of the Montreal Tramways, Montreal, Que., died recently after almost 40 years service with that organization. During that time this pioneer street railway builder personally supervised the installation of all the present 300-mile track system in Montreal. Moreover, the personnel of the track department of the Montreal Company includes three sons, a son-in-law, and several grandchildren of Mr. Scott, all of whom received their training under his broad experience, forceful personality and unexcelled knowledge of city railway track work.

When Mr. Scott joined the old Montreal horse car system in 1892, he found tracks built of flat strap rail spiked to 6x8 in. wooden stringers. In the three following years this construction was entirely replaced by 56-lb. tee 72-lb. girder and the 88-lb. girder guard rails, laid on 7-ft. ties with wood block paving. Subsequently, in 1899, such construction was in turn replaced by 87-lb. high tee rail supported on concrete stringers with scoria block paving. Finally in 1911 and 1913 to date, the present Montreal standards of track construction, consisting of 115-lb. girder grooved and 132-lb. girder guard rails on 8-ft. wood ties, stone ballast foundation, concrete paving base and granite block or sheet asphalt paving were installed by the Montreal roadmaster. Mr. Scott spoke with authority on tramway construction methods in use before hack saws, acetylene torches, crane cars and other mechanical aids were known.

Born at Salisbury, N. B., in 1860, the late roadmaster commenced an active railroad career when sixteen years of age by assisting his father to build the Canadian Pacific Railway line between Edmundston and Saint Leonard. Following completion of this work, he was engaged with the Miramichi Railroad, then constructing a line between Marysville and Woodstock, N. B. Later he assumed charge of the Greenville Junction Section on the Canadian Pacific Railway.

In 1892, when the Montreal Street Railway commenced to install track for the first electric lines in that city, Thomas Scott was called to Montreal by the late F. P. Brothers. Subsequently, in 1897, he laid 25 miles of electrified track for the Jamaica Electric Railroad in Kingston, Jamaica; and later, in 1899 and 1900, built some 10 miles of line in Georgetown, British Guiana.

William Scott, eldest son of Thomas Scott, has been appointed to succeed him as general roadmaster in Montreal.

R. S. Campbell

Robert Stewart Campbell, a prominent figure in the electrical industry 30 years ago in Salt Lake City, died at his home in that city on Sept. 5. Mr. Campbell was born in Salt Lake City in 1854, and secured his electrical engineering education at the University of Utah. In 1873 he entered the employ of the Utah Northern Railway, at Logan, Utah, and later was elected

Mayor of that city, in which capacity he served two terms. After spending several years in general business, he became manager of the Utah Light & Power Company, with supervision also over the street railway system in Salt Lake City. In 1906 he negotiated the sale of the company to the E. H. Harriman interests.

Gus Koch

Gus Koch, for many years coast agent of the St. Louis Car Company, died on Sept. 19 of injuries resulting from an automobile accident on Sept. 17 while he was crossing Kearny Street at Sutter Street in San Francisco. For more than 30 years he ably represented the St. Louis Car Company. Mr. Koch would have attained the age of 81 years on Sept. 24. During his later years, Edward S. Sullivan, his office associate and friend for more than 25 years, acted as his assistant and succeeds to his office as Coast agent. Mr. Koch played an important part in the early development of electric transportation on the Coast. Few railroad men on the Coast were more widely known or held in higher regard.

G. B. Willcutt

George B. Willcutt, vice-president and secretary and a member of the board of directors of the Market Street Railway, San Francisco, died in that city on Sept. 17, at the age of 72. He was the dean of local transportation men on the Pacific Coast, having completed 45 years association with the Market Street Railway and its predecessors. At the time of his death, he was also assistant secretary of the California Oregon Power Company, a position which he had held for some years. He was graduated from the University of California with the class of 1879, and later studied at the Massachusetts Institute of Technology, from which he was graduated in 1883. Prior to entering the street railway business, he was a mining engineer and was one of the original engineers on the famous Anaconda mine in Montana.

Col. Edward Alfred Simmons, publisher of *The Railway Age* and several other publications, died of a cerebral hemorrhage on Sept. 30 in his home in Brooklyn. He was 56 years old. Although it was necessary for him to leave school when he was only fourteen years old, Colonel Simmons rose to prominence as a publisher, manufacturer, soldier and civic worker and became a leader in many clubs and national societies. For twenty years he had been president of the Simmons-Boardman Publishing Company. He also was chairman and president of the American Saw Works, the American Machine Tool Company and the Rogers-Eagle Grinding Machine Company, all of Hackettstown, N. J.

INDUSTRY MARKET AND TRADE NEWS

Bids Received for New York Subway Cars

The cost of 300 additional cars fully equipped for service on the Bronx, Long Island City and Coney Island sections of the new city subway system will be about 27 per cent less than that of the 300 cars ordered eighteen months ago, according to the Board of Transportation. Four bids were received for the cars, and two for the motors and control.

The lowest bid of \$6,326,400 for the construction of 300 was submitted by the American Car & Foundry Company, the builder of the first 300 cars. Westinghouse Electric & Manufacturing Company, which also equipped the original order, submitted the lowest bid of \$2,220,000 for the motor and control equipment for 300 cars. Bids on blocks of 1,000 and 1,500 cars were received from the St. Louis Car Company, being \$28,625,000 and \$43,612,500 respectively.

Decision on the number of cars to be ordered has not yet been made by the Board of Transportation, but it is reported that the American Car & Foundry probably will receive the contract if less than 1,000 cars are ordered.

Board of Transportation engineers calculate that the contract awards on the basis of the lowest bids would provide 300 fully equipped cars for \$8,546,400, or \$28,488 per car, as compared with \$11,376,397, or \$37,921 per car, for the order of eighteen months ago.

South American Bus Market Beckons Manufacturers

A promising future market in South America for American trucks and buses is indicated by a survey of the automotive division of the Commerce Department. Despite the world depression, truck and bus registrations in South America have trebled during the last five years. Figures show that the American automotive industry has supplied from 90 to 95 per cent of the total number of these vehicles.

At the close of 1922 there were 5,078 trucks and buses in operation in South America. By the end of 1924, this number increased to 14,678. The next two years proved to be the turning point in commercial vehicle development. At the end of 1926 more than 56,000 commercial vehicles were registered. In 1928, the total registration had increased to 134,000, and in 1929 it rose to 174,000. By the end of 1930, the figure was 182,000.

Argentina and Brazil account for 78 per cent of the total number of trucks, having a total of 171,000. Chile, with 10,632 trucks, and Uruguay, with 9,330, are next in importance. The number of buses in operation at the end of 1930 was 10,623, with 2,800 in Argentina, 1,500 in Brazil, 1,500 in Venezuela, 1,475 in Chile, and 1,250 in Colombia. The remainder were distributed in smaller amounts in the other countries.

Foreign trade advisers report that despite progress in recent years much remains to be done in highway construction in South America. The total road mileage for the continent is insignificant when compared to the 3,000,000 miles in the United States. It is estimated that nearly half of the road mileage in South America is in Argentina, with Brazil having about one-fourth. Because of the unfavorable economic situation the 1931 highway programs have been generally trimmed.

\$2,500,000 for Mechanical Parts of Pennsylvania Locomotives

Orders for the construction of the chassis and mechanical parts of 60 electric freight locomotives were announced by the Pennsylvania Railroad. Electrical equipment for these locomotives and for 90 electric passenger engines was ordered in the spring from the Westinghouse Electric & Manufacturing Company and the General Electric Company.

Construction and material costs for the 60 chassis ordered will approximate \$2,500,000. Parts included in this order consist of driving wheels, axles, trucks, frame and cab, and the structural parts in which the electrical apparatus will later be installed.

Of the locomotives ordered, 30 will be built by the Lima Locomotive Works at Lima, Ohio, 20 by the Westinghouse Electric & Manufacturing Company, Eddystone, Pa., and ten in the Pennsylvania Railroad shops, at Altoona, Pa.

Construction schedules call for deliveries on the 60 locomotives to begin in March of next year. It is anticipated that the 150 freight and passenger locomotives to be used in the New York-Washington electrification will be ready for operation in 1933.

Osgood Bradley Speeds Construction of Subway Cars

The recent order for twenty cars obtained by the Osgood Bradley Car Corporation from the Ferrocarril Terminal Central de Buenos Aires, Argentina, will be completed by Dec. 1. Details of design and the specialties to be used have been settled, and the construction work is now progressing rapidly.

Motors and control equipment will be supplied by the General Electric Company, each car having two 125-hp. motors, inside hung. Westinghouse Air Brake Company will supply the air brakes and compressors, and the National Pneumatic Company the door mechanisms. The exterior finish will be Dulux, and the interior trim and headlining of aluminum alloy. Seating capacity is 47 and the total weight is 72,000 lb.

The cars will be used in the operation of the new subway now under construction.

J. G. Brill Completes Delivery of 40 Cars

During the past month the J. G. Brill Company has made deliveries of ten cars to the Philadelphia & Western Railway, and 30 cars to the Cia Chilena de Electricidad, Ltd., of Santiago, Chile.

The Philadelphia & Western Railway cars are for high-speed interurban service, and have a capacity of 56 seated passengers. These cars have an over-all length of 55 ft. 2 in. The total weight has been held down to 52,290 lb. by aluminum body construction.

The South American cars are of the two-man, double-truck type, with a seating capacity of 36. These cars will be operated in city service. Motors and control for both orders were furnished by the General Electric Company. The body is all steel, making the total weight of the car 32,500 lb. Doors are of the end folding type, with Consolidated Car Heating Company mechanism.

Specification details for the Philadelphia & Western cars:

Number of units.....	10
Type of unit..One-man, motor, passenger, interurban, double end, double truck	
Number of seats.....	36
Date of order.....	6/22/31
Date of delivery.....	9/10/31
Weights: Car body.....	21,330 lb.
Trucks.....	16,000 lb.
Equipment.....	14,960 lb.
Total.....	52,290 lb.
Bolster centers.....	34 ft. 0 in.
Length over all.....	55 ft. 2 in.
Length over body posts.....	37 ft. 8 in.
Truck wheelbase.....	6 ft. 6 in.
Width over all.....	9 ft. 2½ in.
Height, rail to trolley base.....	10 ft. 6½ in.
Window post spacing.....	2 ft. 9 in.
Body.....	Aluminum
Roof.....	Oregon fir, arch
Doors.....	Plymetl end
Air brakes.....	Westinghouse Air Brake, straight air emergency with safety control
Armature bearings.....	Sleeve
Axles.....	Annealed steel
Car signal system.....	Westinghouse Pneumatic horn
Compressors.....	General Electric, 127-B-9
Conduit.....	Flexible
Control.....	General Electric, P.C.-12-N.
Couplers.....	Tomlinson, Form 16
Curtain fixtures.....	Adams & Westlake, red No. 65
Curtain material.....	Pantastone
Door mechanism.....	National Pneumatic Co
Doors.....	Folding
Fare boxes.....	Ohmer, portable
Finish.....	Aluminum (Dulux)
Floor covering.....	Double thickness, Oregon fir
Gears and pinions	General Electric, heat treated
Glass, Libby-Owens non-shatterable in side sash.....	Side sash
Du-plate non-shatterable in vestibule and doors.....	Peacock staffless
Hand brakes.....	Stainless steel tubing
Hand straps.....	Armstrong Cork Co.
Heat insulating material.....	Consolidated Car Heating Co.
Heaters.....	Arch
Headlights.....	Ohio Brass, special 12, SDF type
Headlining.....	Aluminum
Interior trim.....	Chromium plated
Journal bearings.....	Sleeve
Journal boxes.....	Brill, semi-steel
Lamp fixtures.....	Adams & Westlake, No. 26-A-30
Motors....Four General Electric, 706-B, inside hung	
Painting scheme.....	Maroon and tan, DuLux
Roof type.....	Arch
Roof material.....	Oregon fir
Safety car devices.....	Dead man feature with door and brake interlock
Sash fixtures.....	Adams & Westlake, stainless steel
Seats.....	Brill, No. 202-F
Seat spacing.....	2 ft. 9 in.
Seating material.....	Leather
Slack Adjusters.....	American Brake Co.
Steps.....	Stirrup
Tire tread.....	Aluminum, anti-slip
Trucks.....	Brill, 89-E-2
Ventilators.....	Brill, automatic
Wheels.....	Rolled steel, diameter 28 in.
Special devices.....	Mirror on each end. Crew Signal System, Faraday single stroke bell, storage battery. Exide Ironclad KXK-9, Pyrene fire extinguishers.

Bus Deliveries

Baltimore Coach Company, Baltimore, Md., ten A.C.F., 29-passenger, street car type.

Brooklyn Bus Corporation, Brooklyn, N.Y., 60 Twin Coach, 50 Model 40, and ten Model 30.

Columbia Railway, Gas & Electric Company, Columbia, S.C., two Twin Coach, Model 30.

Connecticut Company, Hartford, Conn., nine Yellow Coach, 38-passenger, city type.

Eastern Massachusetts Street Railway, Boston, Mass., ten Twin Coach, eight Model 30, and two Model 40.

Los Angeles Railway, Los Angeles, Cal., seven Yellow Coach, 25-passenger, city type.

Middlesex & Boston Street Railway, Newtonville, Mass., four White, Model 64A.

Pacific Electric Railway, Los Angeles, Cal., seven Yellow Coach, 25-passenger, city type.

Reading Transit Bus Company, Reading, Pa., two Twin Coach, Model 30.

St. Joseph Railway, Light & Power Company, St. Joseph, Mo., two Mack, 21-passenger, city type.

Syracuse Railway Co-ordinated Bus Line, Syracuse, N.Y., six Twin Coach, Model 30.

Third Avenue Railway, New York, N.Y., ten White, Model 54A.

United Railway & Electric Company, Baltimore, Md., ten Yellow Coach, 33-passenger, city type.

West Ridge Transportation Company, Giraud, Pa., one A.C.F., 25-passenger, parlor type.

Worcester Consolidated Street Railway, Worcester, Mass., ten Yellow Coach, seven 38-passenger city type, and three 29-passenger, city type.

Brooklyn Bus Corporation Orders 50 Mack Buses

Brooklyn has placed with Mack Trucks, Inc., an order for 50 buses of the Model BT, Metropolitan type. The bus has a 43-passenger capacity and is powered with a six-cylinder, 126-hp. Mack engine. Deliveries of this order, which is said to approximate \$600,000, are expected to be completed within three months.

This order increases the number of buses ordered by the Brooklyn Bus Corporation to 200. The Twin Coach Corporation received orders for the first 150 buses and has already delivered a large portion of the order.

The Mack order is for a street car type bus, with a center-exit door, and a front-entrance door just ahead of the front wheel. The doors will each have a width of 46 in. to permit two streams of passengers to board or alight.

Conspectus of Indexes for September, 1931

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares* 1913 = 4.84	Sept., 1931 7.81	Aug., 1931 7.81	Sept., 1930 7.78	July, 1931 7.81	Sept., 1926 7.35
Electric Railway Materials* 1913 = 100	Sept., 1931 116	Aug., 1931 113	Sept., 1930 133	Dec., 1926 159	Aug., 1931 113
Electric Railway Wages* 1913 = 100	Sept., 1931 232.9	Aug., 1931 232.9	Sept., 1930 231.8	April, 1931 233.2	Sept., 1926 226.1
Electric Ry. Construction Cost* Am. Elec. Ry. Assn. 1913 = 100	Sept., 1931 167	† Aug., 1931 167	Sept., 1930 196	Nov., 1928 206	Aug., 1931 167
General Construction Cost Eng'g News-Record 1913 = 100	Sept., 1931 171.4	† Aug., 1931 171.4	Sept., 1930 199.6	Jan., 1927 211.5	Aug., 1931 171.4
Wholesale Commodities U.S. Bur. Lab. Stat. 1926 = 100	Aug., 1931 70.2	July, 1931 70.0	Aug., 1930 84.0	Sept., 1928 100.1	June, 1931 70.0
Wholesale Commodities Bradstreet 1913 = 9.21	Sept., 1931 8.49	Aug., 1931 8.79	Sept., 1930 10.42	Jan., 1928 13.57	Sept., 1931 8.49
Retail Food U.S. Bur. Lab. Stat. 1913 = 100	Aug., 1931 119.7	July, 1931 119.0	Aug., 1930 143.7	Dec., 1926 161.8	June, 1931 118.3
Cost of Living Nat. Ind. Conf. Bd. 1923 = 100	July, 1931 85.9	June, 1931 85.9	July, 1930 95.2	Nov., 1926 104.0	June, 1931 85.9
General Business The Business Week Normal = 100	Sept. 5, 1931 72.5	Aug. 8, 1931 73.4	Sept. 6, 1930 83.5	Oct. 6, 1928 117.6	Aug. 29, 1931 71.0
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	Aug., 1931 97.3	July, 1931 97.9	Aug., 1930 105.3	Feb., 1929 140.4	Aug., 1931 97.3
Bank Clearings Outside N.Y. City 1926 = 100	Aug., 1931 66.0	July, 1931 68.6	Aug., 1930 86.9	Oct., 1929 111.8	Aug., 1931 66.0

*The four index numbers marked with an asterisk are computed by Mr. Richey. Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation

and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 115 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

†Revised.

Material Prices

OCTOBER 2, 1931

Metals—New York

Copper, electrolytic, delivered, cents per lb.	7.00
Lead	4.23
Nickel, ingot	35.00
Zinc	3.95
Tin, Straits	22.20
Aluminum, 98 to 99 per cent	22.90
Babbitt metal, warehouse	
Commercial grade	34.75
General service	29.00

Track Materials—Pittsburgh

Standard steel rails, gross ton	\$43.00
Track spikes, $\frac{1}{2}$ -in. and larger, per 100 lb.	\$2.70
Tie plates, steel, cents per 100 lb.	1.95
Angle bars, cents per 100 lb.	2.75
Track bolts, per 100 lb.	3.90
Tie, 6m.x 8m.x 8 ft.	
White Oak, Chicago	1.05
Long leaf pine, New York	1.00

Waste—New York

Waste, wool, cents per lb.	11.00
Waste, cotton (100 lb. bale), cents per lb.	5.50-9.00
White	5.50-8.00

Wire—New York

Bare copper wire, cents per lb.	9.00
Rubber-covered wire, No. 14, per 1,000 ft.	\$3.75

11.00

Paint Materials—New York

Linseed oil (5 bbl. lots), cents per lb.	8.20
White lead in oil (100 lb. keg), cents per lb.	13.25
Red lead in oil	14.75
Turpentine (bbl. lots), cents per gal.	38.00
Putty, com'l grade, 100 lb. tubs, cents per lb.	5.50

8.20
13.25
14.75
38.00
5.50

Hardware—Pittsburgh

Wire nails, per kg.	\$1.90
Sheet iron (24 gage), cents per lb.	2.40
Sheet iron, galvanized (24 gage), cents per lb.	2.90
Auto body sheets (20 gage), cents per lb.	3.10
Fender stock (20 gage), cents per lb.	3.20

\$1.90
2.40
2.90
3.10
3.20

Bituminous Coal

Pittsburgh mine run, net ton	\$1.35
Central Ill. screenings	1.00
Kansas screenings, Kansas City	1.10
Big seam, Ala., mine run	2.15
Smokeless mine run, Chicago	1.90

\$1.35
1.00
1.10
2.15
1.90

Paving Materials

Paving stone, granite, 5 in., f.o.b. New York—Grade 1, per thousand	\$120.00
Wood block paving 3 $\frac{1}{2}$, 16 lb. treatment, N.Y., per sq.yd., f.o.b.	2.00
Paving brick, 3 $\frac{1}{2}$ x8x4, N.Y., per 1,000 in. carload lots, f.o.b.	50.00
Paving brick, 3 $\frac{1}{2}$ x8x4x4, N.Y., per 1,000 in. carload lots, f.o.b.	45.00
Crushed stone, 1-in., wholesale, f.o.b. per cu.yd.	1.80
Cement, Chicago, in carload lots, without bags, delivered	1.95
Gravel, 1-in., cu.yd., wholesale, f.o.b.	1.60
Sand, cu.yd., wholesale, f.o.b.	1.00
Asphalt, in pkg. N.Y., f.o.b. ref., per ton	16.00

\$120.00
2.00
50.00
45.00
1.80
1.95
1.60
1.00
16.00

Scrap—New York

Heavy copper, cents per lb.	5.00
Light copper	4.15
Heavy brass	2.60
Zinc	1.50
Lead, heavy	3.00
Mixed babbitt	3.25
Battery lead plates	1.20
Cast aluminum	4.75
Sheet aluminum	8.25
Auto radiators	2.80
Tires, standard, mixed, per ton	\$3.00
Inner tubes, mixed, per cwt.	\$1.20

5.00
4.15
2.60
1.50
3.00
3.25
1.20
4.75
8.25
2.80
\$3.00
\$1.20

Old Material—Chicago

Steel car axles, net ton	\$11.75
Cast iron car wheels, gross ton	9.75
Steel car wheels, gross ton	9.00
Leaf springs, cut apart, gross ton	10.00
Angle bars, gross ton	9.50
Brake shoes, net ton	6.00
Steel rails (short), gross ton	11.25
Relaying rails, gross ton (65 lb. and heavier)	24.50
Machining shop turnings, gross ton	4.25
Coil springs, per gross ton	10.25
Frogs, switches and guards cut apart, per gross ton	8.25

\$11.75
9.75
9.00
10.00
9.50
6.00
11.25
24.50
4.25
10.25
8.25

IN 1930-31

(JULY TO JULY)

5 , 5 0 0 , 0 0 0 , 0 0 0

**PASSENGERS CARRIED
WITH ONLY 9 FATALITIES**



*Most of the trolley-cars
are Peacock Staffless
Brake equipped . . . !*

How About Yours?

•

S A F E T Y - S P E E D - C E R T A I N T Y

•

National Brake Company

890 Ellicott Square, Buffalo, N. Y.

Canada:—Lyman Tube & Supply Co., Ltd., Montreal
The Elleon Co., General Sales Representative, 50 Church Street, New York City



Modern pneumatic truck tires — regardless of make — need a modern rim which makes tire changing quick and easy.

Let your eye follow that arrow, and you will see how Goodyear builds the rim which meets this need — *a split base rim with continuous ring and open end valve slot*—a rim that takes the fight out of tire changing.

You can use Goodyear K Rims straight through your fleet—on large wheels or small ones. They mean greater speed in mounting tires or taking them off—as well as safety, lightness with strength, and are fully interchangeable. Find out all the advantages—and savings—specify K Rims—write to Rim Department, The Goodyear Tire & Rubber Company, Inc., Akron, Ohio.

"THE MAN WHO CHANGES THE TIRES LIKES 'K' RIMS"

GOOD  **YEAR**
K-28 **R I M S** **K-18**

for 28° bevel mountings

Sizes: 5", 6", 7", 8"
and 9-10"

"GOODYEAR TIRES ARE THE ONLY TIRES TO USE IN OUR TYPE OF SERVICE"

-says Tanner Motor Tours

*Forty coaches comprise the
sightseeing fleet of Tanner
Motor Tours, Los Angeles,
California. For 5 years,
they have used Goodyear
Tires exclusively.*



"**W**HERE distances are great and safety must be combined with dependable performance . . . Goodyear Tires are the only tires for our type of service." These statements are taken straight from a letter written by **Tanner Motor Tours**. "In your All-Weather Tread we get sure-footed safety that is so important, particularly over mountain roads. The Supertwist cord, too, gives extra resilience and vitality so that delays in our schedules have been practically unknown. That is why, for the past five years, we have been using Goodyear Tires exclusively."

Isn't that a good reason why your fleet also should be on Goodyears?



THE GREATEST NAME IN RUBBER

GOOD YEAR

IT PAYS TO SPECIFY GOODYEARS WHEN YOU ORDER NEW COACHES



MILWAUKEE WINS - - - AND THERMIT ALSO



Wells Street, Milwaukee, between 28th Street and 33rd Street. This photograph shows excellent condition of track and pavement six years after laying.



Greenfield Ave., Milwaukee, nine years after laying of track and paving.

The

M E T A L & T H E R M I T

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. San Francisco

Toronto

SCORES AGAIN!

7 out of 9

• MORE REVENUE FROM MORE RIDERS" *The Milwaukee Way!*

• This was the principal theme in the Milwaukee Brief! Everything possible to make riding attractive! A fare system to appeal to the pocket-book! Rolling stock that is modern and comfortable! . . . And track that is smooth riding and quiet.

Milwaukee was one of the early users of Thermit! Since 1915, they have been steadily adding to the number of Thermit welded joints.

Now 70% of all track of this Company, located in paved streets, is Thermit welded.

One of the "accomplishments" cited in the Milwaukee Brief for the Coffin Award is their recent adoption of the new method—"Thermit-Welding-Under-Traffic." Here it what they say it does—(1) eliminates night-work; (2) obtains better workmanship in daylight; (3) decreases hazards of night-work; (4) effects savings by welding joints as soon as rails are cut-in to the track, instead of placing temporary paving, and re-opening at night. When rails are cut-in several days in advance of welding, the track foundation may be loosened and damaged before the welds are applied.

COFFIN AWARDS Since 1923

Users of Thermit Welding
are marked with check ✓

✓	1923	CHIC., NO. SHORE & MILW. R.R.
	1924	NORTHERN TEXAS TRACTION CO.
✓	1925	PITTSBURGH RAILWAYS COMPANY
✓	1926	PENNSYLVANIA-OHIO ELECTRIC CO.
✓	1927	GRAND RAPIDS RAILROAD CO.
✓	1928	VIRGINIA ELEC. & POWER CO.
	1929	CHIC., SO. SHORE & SO. BEND R.R.
✓	1930	YOUNGSTOWN MUNICIPAL RY. CO.
✓	1931	MILW. ELEC. RY. & LIGHT CO.



CORPORATION

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. Francisco

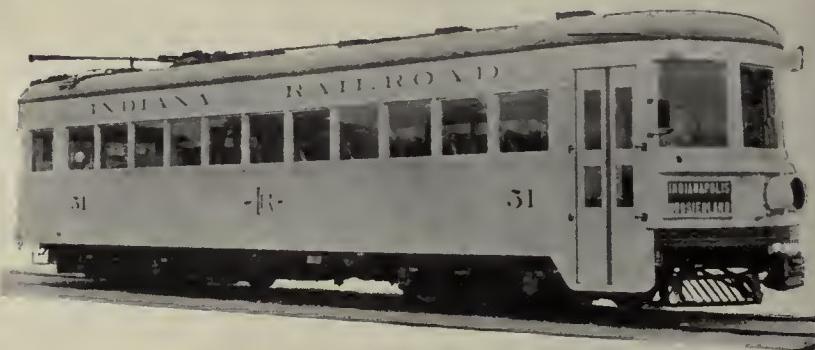
Toronto

35 INDIANA SERVICE CORPORATION NEW LIGHT WEIGHT CARS

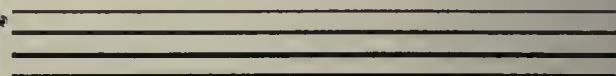
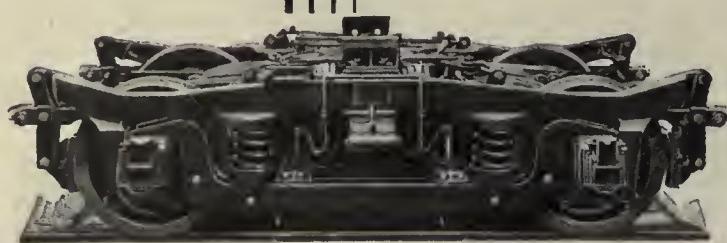
Commonwealth Trucks

"EQUALIZED SWING MOTION TYPE"

These high-speed interurban passenger cars are an outstanding example of modern engineering. They are equipped with Commonwealth light weight equalized swing motion trucks, the frame including pedestals, likewise the bolster and spring plank being integral steel castings.

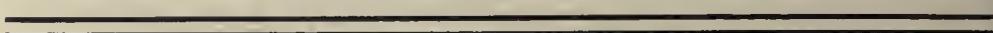


Commonwealth trucks are a most important factor in making possible an unusually high-speed schedule. These trucks provide for the utmost in riding comfort, maximum of safety and lowest possible maintenance costs. Investigate their possibilities for your service.



GENERAL STEEL CASTINGS
CORPORATION

EDDYSTONE, PENNA.
GRANITE CITY, ILLINOIS



98,000 MILES PER EXIDE



"We are highly pleased with the service and economy made possible by Exide Batteries"—Reading Transportation Company.
Let's show you how to get lowest cost per bus mile.



The Exide Motor Coach Battery—long-lived, dependable, economical.

Exide
MOTOR COACH
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

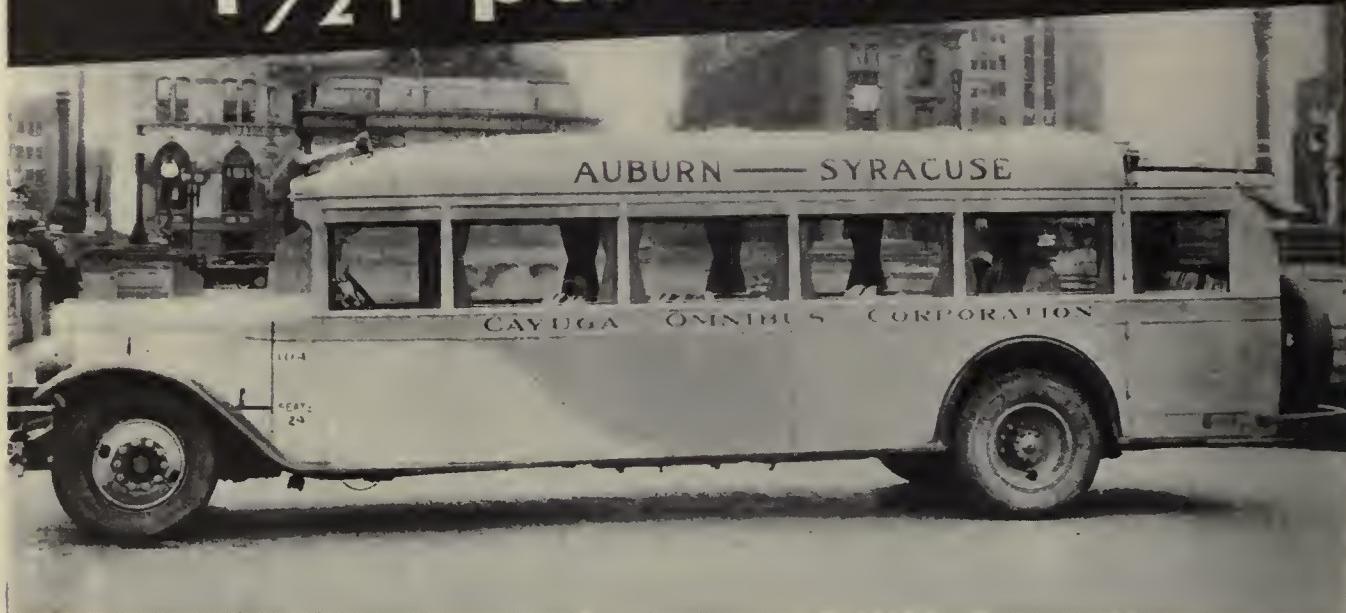
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto

EXIDE

EXIDE</

SOCONY helps save 1½¢ per bus mile



One of the Socony fueled and lubricated buses operated by the Cayuga Omnibus Corporation between Auburn and Syracuse, N. Y. This company also operates buses in Auburn and the surrounding territory.

FROM 22.3¢ per bus mile to 20.8¢ per bus mile . . . that's the reduction made in operating expenses since Socony has been fueling and lubricating the twenty-one buses of the Cayuga Omnibus Corporation operating in the city of Auburn, New York, and in the immediate vicinity. Also—the buses have turned in better service records with less time out for repairs

since Socony was put on the job, fulfilling the company's motto, "Intelligent Transportation."

For low-cost, efficient operation, you will find that Socony products fuel and lubricate your fleet most satisfactorily. That's so whether you operate six buses or sixty, and whether you run them ten miles a day or one hundred.

SOCONY

BANNER GASOLINE SPECIAL GASOLINE plus ETHYL SOCONY DE-WAXED MOTOR OIL

STANDARD OIL COMPANY OF NEW YORK



FROM CALIFORNIA TO SOUTH AFRICA . . .

MASTIPAVE

*adds years of life
to street car floors . . .*

Durban, South Africa, says: * After 2700 miles, carrying 423,000 passengers, "no signs of wear whatever" . . . "maintenance cost nil" . . . "cars cleaned in one-third of the time" . . . "easier on conductors' feet" . . . "continuing to cover all cars."

In San Francisco a similar story. And wherever MASTIPAVE is used! Street cars, factories, railroads, schools, hospitals, offices. Any floor or stairway that must withstand heavy traffic. Will even outwear steel treads.

MASTIPAVE is very low in cost and extremely durable. Waterproof, rot-proof, vermin proof. Non-slip even when wet. Resilient, quiet. Write for free booklet.

* Name on request

THE PARAFFINE COMPANIES, INC.

475 BRANNAN STREET, SAN FRANCISCO

Offices in Principal Cities

THE COTT-A-LAP COMPANY

SOMERVILLE, NEW JERSEY

Manufacturers of Pab-Cote, Pabco Multi-Service Paints, Varnishes, Lacquers and Enamels, Pabco Waterproofing Paints and Compounds, Mastipave, Pabco 10, 15 and 20 Year Roofs, Malthoid Membrane Dampcourse, Pabcoband and Other Products

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**THE LOW-COST
LONG-LIFE
FLOOR COVERING**

• • **PABCO MASTIPAVE** • •

MORE and MORE OPERATORS



21-PASSENGER CITY TYPE COACH



21-25 PASSENGER PARLOR COACH

1-Prefer these sizes 2-Prefer Fargo Coaches in these sizes

More and more operators are showing a preference for these sizes on many routes for reasons of greater economy and greater adaptability. And more and more operators are selecting Fargo Coaches for the following reasons:

BECAUSE the City Type, with seats for 21 passengers and aisle and loading well space for upwards of 40 standees, provides the increased capacity needed for the peak hours.

BECAUSE circulating load features in the City Type assure rapid passenger movement.

BECAUSE the 21-25 passenger Parlor Coach, with reclining seats, provides ample capacity for average inter-city service.

BECAUSE these coaches . . . with a wheelbase of 172 inches . . . provide the greatly desired flexibility in traffic and the interior roominess usually available only with a much longer wheelbase.

BECAUSE each coach is modern through and through—with its economical 120-horsepower 8-cylinder engine that is readily accessible or quickly removable; full-floating worm-drive rear axle; 10" double-drop frame; unusually short turning radius; internal hydraulic 4-wheel brakes with booster; 10 $\frac{3}{4}$ -gallon cooling system; and many other features whose advantages have been amply proved by exacting operators for hundreds of thousands of revenue miles.



FARGO MOTOR CORPORATION, DETROIT, MICHIGAN
DIVISION OF CHRYSLER CORPORATION

For low cost-per-mile For trouble-free service

For Safety



It is significant that Bethlehem Wrought Steel Wheels are so widely used on electric railways. Significant, because there is no more severe service demanded of wheels than that resulting from today's higher speeds, and the much quicker starting and stopping of cars. Only wheels of high character can stand up under the extremely heavy traffic of modern cities and their suburbs.

Bethlehem Wrought Steel Wheels have strength, endurance and wearing qualities worked into them during the process of manufacture. Five distinct forging and rolling operations are required to make a Bethlehem Wheel. The forging gives the metal density and toughness. The rolling establishes a refinement of grain structure, with a corresponding increase in strength and ductility. Each wheel is carefully inspected at every step throughout the process of manufacture.

If you investigate these wheels you will learn, as so many other electric railway executives have learned: that for trouble-free service, for safety, for low cost-per-mile, Bethlehem Wrought Steel Wheels are unsurpassed.

BETHLEHEM STEEL COMPANY



General Offices: BETHLEHEM, PA.

District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, St. Louis.

Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Los Angeles, Seattle, Portland, Honolulu.

Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City

BETHLEHEM Wrought Steel Wheels



Be Prepared . . . change to the correct
winter grade of **KOOLMOTOR OIL**
the perfect Pennsylvania Motor Oil

THIS Winter protect your heavy-duty, high-powered bus engine—and your profits—against the wear, tear and expense of hard starting. Prevent undue, costly strain on your batteries and starting mechanism by using KOOLMOTOR Oil—the ideal Winter lubricant.

This special *low cold-test* oil flows freely at the touch of the starter—distributes quickly

to moving surfaces—eliminates the drag of slow starting.

And remember the fact that KOOLMOTOR Oil cools as it lubricates. This cooling feature is equally as important to your hot running bus engines in Winter as in Summer—combustion temperatures are the same inside your engine irrespective of whether outside conditions are warm or cold.

Cold days are coming—be prepared! Order your Winter's supply of KOOLMOTOR now.

Write to CITIES SERVICE
60 Wall Street • New York



Cities Service
Radio Concerts
*Fridays, 8 P. M., Eastern
Standard Time, WEAF
and 36 Associated Stations
on N. B. C. Coast-to-Coast
Network — Cities Service
Orchestra, Cavalliers and
Jessica Dragonette.*

Cities Service Oils and Gasolene



THE
NOVEMBER NUMBER
OF
ELECTRIC RAILWAY JOURNAL

will illustrate and describe the maintenance methods and equipment used by the Georgia Power Company in obtaining the remarkable results that won this Award.

Special articles in the November Number will be devoted to this subject, analyzing in detail the maintenance methods and practices, and the equipment used by the winning company, such as rolling stock and shops, way and structures, overhead lines, buses, materials, parts and supplies.

In the advertising pages of that Number, additional information will be found in the advertisements of leading manufacturers, displaying and explaining the details of their latest products.

The November Number will be mailed to subscribers November 5. Advertising forms will close October 23.

*Cuts and copy should be sent to Electric Railway Journal,
330 West 42d Street, New York City, N. Y.*

NEVER BEFORE . . .
Such a bus at such a price



Six Cylinder Model Weighing 5500 Pounds « « « \$3500 f. o. b. Kent, Ohio
MODEL "15" 17 PASSENGER

Twin Coach
BY F.R. FAGEOL KENT, OHIO



THE MOST TALKED ABOUT

TWIN COACH builds vehicles to meet a problem. This is the history of the institution and of the man, Frank R. Fageol. It is the secret of any success we have in the transportation field.

In 1922 there was a real demand for a low hung, swift moving coach for the development of commercial transportation on the great highway system which the private automobile had been instrumental in developing.

Thereupon Fageol presented his famous Safety-Coach, which really sponsored highway passenger transportation as we know it today.

In 1927 the Urban Street Railway executives were looking for a motor coach with body and loading arrangements similar to those of the rail trolley car upon which they had built their business for the previous 30 years.

Thereupon Twin Coach offered the successful and standardized 40 passenger Twin Coach with dual motors, today by far the largest seller in its class.

Right now scores of operators in the railway and inter-city bus field are seeking the other extreme, a thoroughly reliable small coach built of genuine motor bus parts and at a list price not to exceed \$3,500.00 fully equipped. They have been in many instances trying to meet their needs with converted general purpose automotive truck or pleasure car chassis, bearing locally built utility bodies.

Neither the patron nor the operator has been happy with such equipment.

Based upon the actual economics of the situation facing the operator and from the wealth of bus engineering experience we now offer for this recently arisen situation the Model 15 Twin Coach.

It is built really to fill the schedules of franchise lines where service must be rendered for policy reasons, whether there is a profit or not; it is built

to carry 17 seated passengers plus quite a few standees, providing for them roomy quarters, full head room, touring car riding comforts and quick passage due to surplus power and the maneuverability in traffic which comes with a 132" wheelbase and a 69" width—plus a driver out in front.

There is something about the low hung appearance of this unit that gives it a fascinating and inviting appearance as far as the prospective customers on the curb are concerned. It has but one step of entry, 12" in height, and the floor level inside the vehicle maintains this height, giving with the wide door an unusually quick loading and unloading arrangement.

The unit is built of the best materials we can buy, all metal with body sides and roof of duralumin. Powered with 6-cylinder Twin Coach designed engine (built by Hercules) mounted on rubber, it offers a tough resistance to hard service in outlying districts with questionable road surfacing. Furthermore it asks remarkably little in the way of maintenance, including gas and oil. In fact the unit shows quality manufacture in every appointment; even to hardware, interior trim, painting and seat structure.

We do not believe this vehicle could be built at the price except under a manufacturing policy like our own where we purposely build a standardized line of vehicles placing ourselves in a position to utilize materials purchased on the basis of interchangeability between models. Every part in this vehicle, except for proportion, has stood the test of service in the hundreds of Twin Coach units already on the road in gruelling "stop and start" service.

As remarked heretofore, in producing this unit we go from the extreme of our success with the large 40-passenger vehicle to the building of this new small transportation tool, because the success of our institution we believe always will lie in our ability and readiness to meet the situation facing the customer.





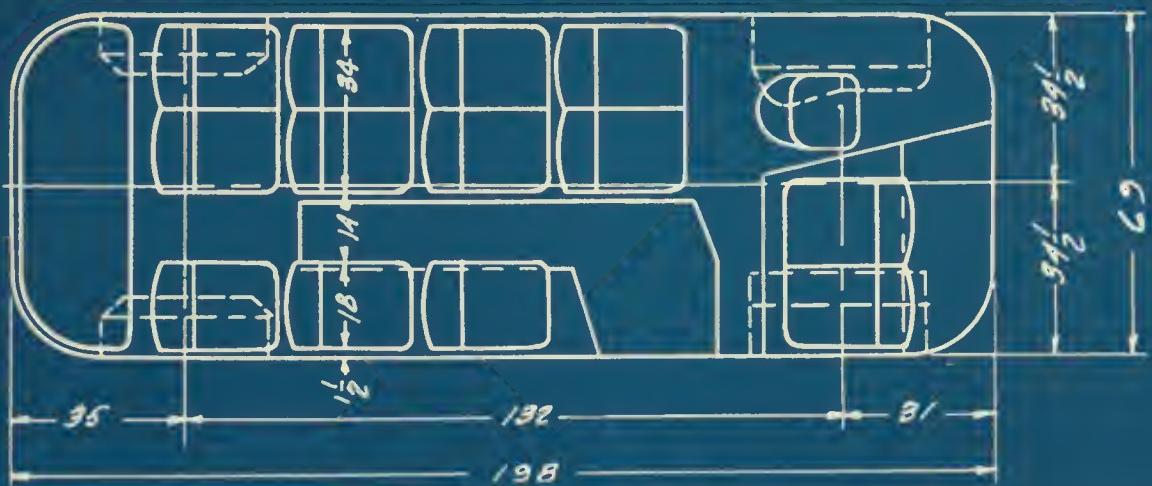
VEHICLE AT ATLANTIC CITY

MODEL "15"

17 PASSENGER



Seating Arrangement



General Specifications

All Twin Coaches Manufactured Under Patents Pending and Issued

Overall length with bumpers and visors.....	213 1/2"
Overall length without bumpers and visors.....	202 1/2"
Overall width.....	69"
Overall height (loaded).....	87 1/4"
Wheel Base.....	132"
Tread, Front and Rear.....	59 1/8"
Turning Radius, approx.	21'
Body Overhang, Front.....	31"
Body Overhang, Rear.....	35"
Interior Head Room in Aisle.....	74"
Interior Head Room at Seats.....	65 1/2"
Road Clearance, minimum under rear axle.....	8"
Road Clearance, lowest point of body.....	10"
Maximum Body Clearance at Front End.....	11 3/4"
Maximum Body Clearance at Rear End.....	12"
Weight.....	5,500 lbs. (approx.)

GENERAL ASSEMBLY—Body and running gear structural framework all made out of steel, riveted together. Running gear consists of special shape brass steel channel cross members onto which spring brackets are mounted.

$\frac{7}{16} \times 1\frac{1}{4} \times 1\frac{1}{4}$ standard tee iron used for body structure extending from body rail to the roof and down to the other side in one piece, except at the end where short interconnecting members are employed. Window upper and lower headers consist of $\frac{7}{16} \times 1\frac{1}{4} \times 1\frac{1}{4}$ angle iron, extended clear around body except that at the entrance and emergency doors the lower window headers are interrupted.

Body outside covering, including roof, roof corners and lower body, is of $\frac{1}{8}$ " thick heat-treated aluminum alloy sheet.

Flooring consists of $\frac{3}{4}$ " thick 7-ply Fir Plywood, specially treated for maximum serviceability. The floor is supported on body sides and at center by means of steel structural members. Floor finish consists of especially prepared plastic composition painted on. This gives a maximum durability and light weight, and is especially easy to maintain.

Glass is used clear around the body. The front corner sash hinge for ventilating purposes, while windshield glass is $\frac{1}{4}$ " laminated safety glass and stationary mounted.

Rear end full quarter corner glass is $\frac{1}{4}$ " plate, while rear end flat glass is $\frac{1}{8}$ " double strength, Grade "A," window glass.

The side windows are provided with heavy duty brass satin nickel finish lift sash, the detailed construction and installation of which is exactly the same as used on the Models 20, 30 and 40 coaches. The upper sash is interchangeable with the intermediate size of sash used on the Model 30. The entrance door is just back of the right front wheel housing and consists of two leaf hinged door, one leaf of which is hinged out from each door post. The door construction consists of extruded aluminum covered by $\frac{1}{8}$ " thick heat-treated aluminum alloy sheet metal. The upper section of the door is paneled with $\frac{1}{8}$ " double strength window glass. Manual control is used for the door from the operator's seat.

EMERGENCY DOOR—Located on left side directly opposite service door, made out of dural structural members paneled on outside with heat-treated aluminum alloy sheet and equipped with raise sash on upper end to match other sash.

LIGHTS—Headlights, two Guide Tilt-Ray type 535 flush mounted.

Marker Lights, standard beehive 3" dia. mounted on each corner of roof. Tail Light, Guide type 264 with Stop Light and License Plate Bracket built integral.

Interior Lights, Two, 5" frosted glass dome lights with 21 C. P. lamps. Dash Light, one dash light at instrument panel.

BUMPERS— $\frac{1}{8}$ spring steel front and rear. These will be the same as delivery unit—(except wider).

VISORS—Sheet aluminum visors on front and rear ends.

ROOF DRAINAGE—Drip ledges provided above doors and windows.

INTERIOR FINISH—Hex. shape pilasters over window posts, between upper and lower window headers. 20 ga. sheet aluminum mounted to blocking with oval head wood screws above window upper headers. Provision for 11" advertising cards on each side.

SEATS—Seating capacity, 17 passengers, seated. Ample room in aisle for standees. Seats, chrome tan leather, semi-bucket type with sheet aluminum

backs and aluminum pedestals. Ample knee room provided throughout. Seating arrangement consists of four dual seats facing forward on left side. Three single seats facing forward on right side. One single seat facing toward rear over right front wheel housing and four passenger settee seats facing forward across rear end. Driver's seat at left front corner where maximum visibility is assured.

HEATING—Kysor Muffler Heater with two floor registers located under seats on left side.

Burgess Muffler used in back of Kysor heater muffler to get maximum silence in operation.

DESTINATION SIGN—Destination sign is located at front end over visor. Glass opening 5" high by 31 1/2" wide.

REAR VISION MIRROR—Rear vision mirror installation above driver, giving complete view of rear and interior.

PAINT SPECIFICATIONS—The same as on other coaches.

MECHANICAL UNITS—Springs—42" long, 2" wide, chrome vanadium steel. All springs are interchangeable. Large capacity rubber bushings used throughout requiring no lubrication. Snubbers consist of rubber block type clamped to springs with "U" bolts.

Front Axle—Timken drop-forged eye-beam section, No. 11706-2.

Rear Axle—Timken No. 51500 semi-floating gear type of conventional design. The standard ratio is 4 5/6 to 1.

Brakes—Four wheel internal expanding hydraulic brakes, 2 1/4" wide by 15" dia. Moulded brake lining and nickel cast iron drums. Emergency brake on transmission, manually controlled with hand lever at driver's right.

Steering Gear—Ross, Model 220 cam and lever type. Steering gear is located at left side ahead of front axle and connected to axle steering wheel with longitudinal ball joint type drag link. 18" wood steering wheel.

Engine—One Hercules, 6-cylinder engine at extreme front end center of body, housed off to give satisfactory dissipation of heat and minimum passenger and driver interference. Detachable "L" head aluminum pistons, No. 3 bell housing and with rubber mounting bushings pressed into sockets, cast integral in bell housing and gear case cover to provide the rubber cushioned four-point support. Engine has accessibility through top and motor housing and through removable shield on right front wheel housing. Bore and stroke, 3 3/4 x 4 1/4; 281.7 piston displacement; 33.75 N.A.C.C. rating; 73 H. P. at 2,800 R.P.M. 176' lbs. torque at 1,000 R.P.M. Force-Feed lubricating system through positive gear pump. External type oil filter. Zenith carburetor with Airmaze Cleaner. A C fuel pump, driven off camshaft. Delco-Remy Automatic Advance Distributor (the same as used on large coaches). D-R Starting Motor. D-R 6-volt generator.

Clutch—Extra large single disc type with J-M lining and nickel iron pressure plate. Oilless bronze pilot bearing. Clutch control consists of short remote linkage 2' pedal.

Self-operating Automatic Clutch optional at small additional cost.

Starter—Eclipse automatic.

Transmission—Brown-Lipe Model 30-C, equipped with heavy duty gears. Ratio 3.3 to 1 in low, 1.68 to 1 in second and 1.1 in high and 4.45 to 1 in reverse; equipped with standard speedometer drive take off and propeller shaft emergency brake. **Free-wheeling unit on rear of transmission**. Free-Wheeling housing carries the emergency brake spider. Transmission shift control by means of conventional lever bent forward slightly to reach driver's seat.

Drive Shaft—Cleveland Steel Products No. 285 series with SKF self aligning roller type midship bearing and SKF midship bearing housing in drive line (the rear drive shaft is the same as used on delivery unit).

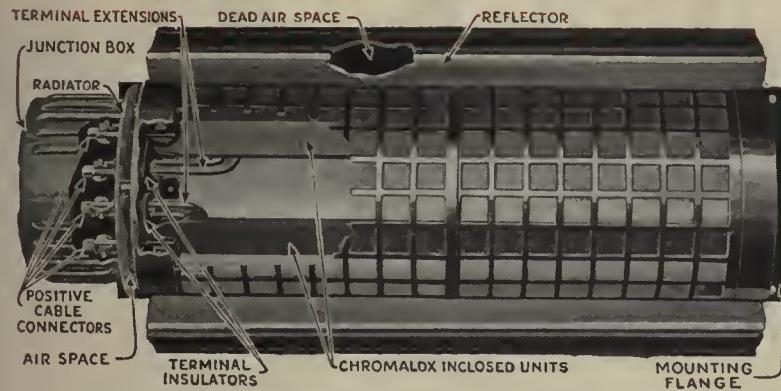
Chassis Lubrication—Alemite throughout.

WHEELS—Twin Coach cast wheels, spoke type made by Dayton. Hubs cast integral front and rear. **TIRES**—Heavy duty balloon 7.50 x 18.

RIMS—Goodyear type "K." **SPARE TIRE CARRIER**—At rear end in vertical position against body panel, substantially mounted. **HORN**—6 volt vibrator type. **WINDSHIELD WIPER**—Folberth heavy duty mounted on windshield side post. **BATTERY**—Exide, 3XEIR, 6 volt, rubber case with folding lift handles mounted at right front corner, very accessible. **SPEEDOMETER**—Driven from back of transmission. Stewart-Warner head mounted on instrument panel in front of driver. Flexible cable drive.

TWIN COACH CORPORATION, KENT, OHIO

Two Great Advances in Car Heating Equipment



"UTILITY"
Reflector
TYPE
Car Heater
WITH
Chromalox
Enclosed Units

Gives Full Use of Electrical Energy Input.

Directs Maximum Amount of Heat to Lower Part of Car.

Heats the Feet and Not the Seat.

The Greatest Improvement Ever Made in Electrical Car Heaters.

"UTILITY-ARCOSTAT"

Temperature Control

Regulates Within One Degree Fahrenheit of Any Predetermined Temperature.

Permanent Operating Point.

Highly Sensitive.

In Actual Service, Through Two Heating Seasons, of 1197 Arcostats Tested and Examined, Only One Out of the Entire Lot Failed to Function 100 Per Cent.

Write at once for full information



Railway Utility Co.

Makers of Heating and Ventilating Equipment for Electric and Steam Railway Cars, Trackless Trolleys and Buses

2241 Indiana Avenue

Chicago, Illinois

FOUR MILLION MILES-



ONLY
5 road delays!

11,400 miles a day. Four million miles a year! Every one of these miles in the South, where summer heat puts an extra strain on tires. Yet under these gruelling conditions, the Camel City Coach Company, operating a fleet of seventy-five buses—HAD ONLY FIVE ROAD DELAYS FOR THE FOUR MILLION MILES! But let Mr. J. L. Gilmer, President of the Atlantic Greyhound Lines, Camel Coach Division, tell you about it:—"Even under the most severe conditions of road and weather," says Mr. Gilmer, "we have found Firestone Balloons, plus Firestone service, an unbeaten combination. As you can imagine, our adoption of Firestone has proven a very considerable operating economy in addition to increasing the traveling comfort of our passengers and the punctuality of our schedules."—Firestone Balloons for your trucks or buses SAVE you money; REDUCE your road delays. Your Firestone dealer nearby will be glad to tell you the whole story. When purchasing new equipment, be sure to ask for Firestone Balloons, Tubes, Rims, Batteries, Brake Lining and Accessories



Firestone
B U S B A L L O O N S

◀◀ LISTEN TO THE VOICE OF FIRESTONE EVERY MONDAY NIGHT OVER N. B. C. NATIONWIDE NETWORK ▶▶



Long-lived strength
unfailing efficiency
lowest center of gravity
permanent silence
these are combined only in
TIMKEN WORM DRIVE
for cars, trolley buses, coaches



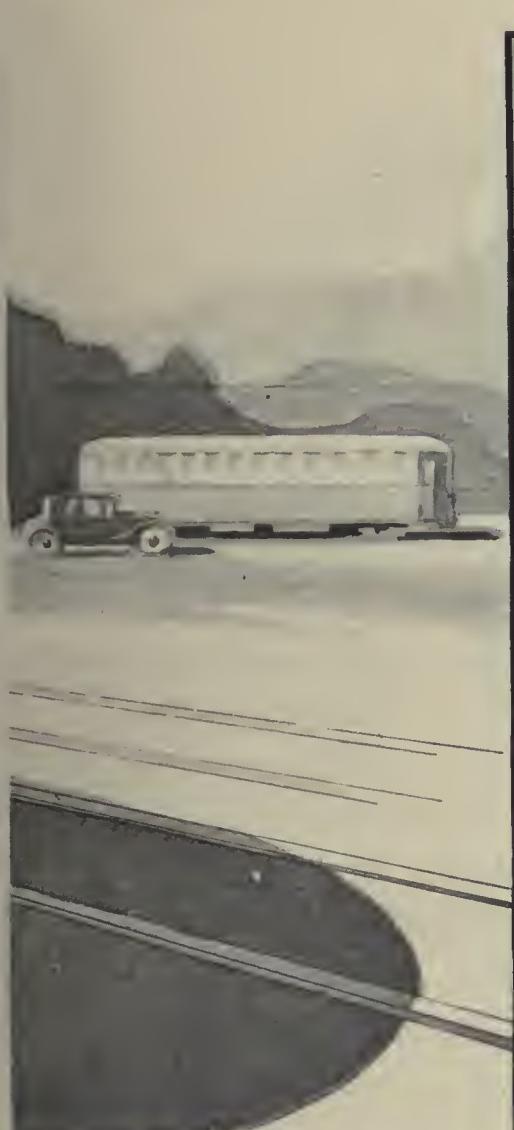
THE TIMKEN-DETROIT AXLE COMPANY, DETROIT, MICHIGAN

LEADER



BARRON

R S H I P



Better than the best laid plans and the furthest reaching theories, is the leadership which puts them into effect. Real leadership discerns the value of effort and weighs present sacrifice against future security. Real leadership gives and commands a full measure of cooperation. Together, leadership and cooperation can master any situation.



**G. COLLIER
INC.**

NEW YORK CITY



The Responsibility of the **Railroad Equipment Manufacturer**

Every railroad equipment manufacturer realizes the responsibility that rests on his shoulders. He must supply equipment that will enable the railroad to operate economically, with a minimum of repairs and replacements and with absolute safety. No manufacturer will assume this responsibility without a great amount of experience behind him. In addition he must maintain a constant series of laboratory experiments to improve his product and to keep abreast of operating conditions. His raw material must be of the best and this material, as well as every step in his process of manufacture, must be carefully checked, inspected and supervised. Many manufacturers continue to inspect their equipment even after it is placed in service. Thus manufacturers are able to stand behind the things they make, and to accept the responsibility for them. The Standard Steel Works Company, because of their adherence to these principles, take pride in accepting their responsibility with assurance. Their products are safe and long-lived.



STANDARD STEEL WORKS COMPANY

GENERAL OFFICES & WORKS: BURNHAM, PENNA.

CHICAGO

AKRON

NEW YORK

PORTLAND

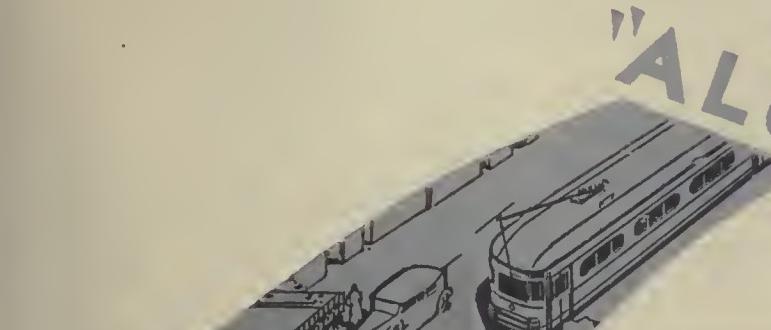
PHILADELPHIA

SAN FRANCISCO

ST. LOUIS

Interurban cars weigh 12,990 lbs. less . . .

"ALUMINIZED"



**Power Savings alone
will absorb the extra
cost in 31 months . . .**



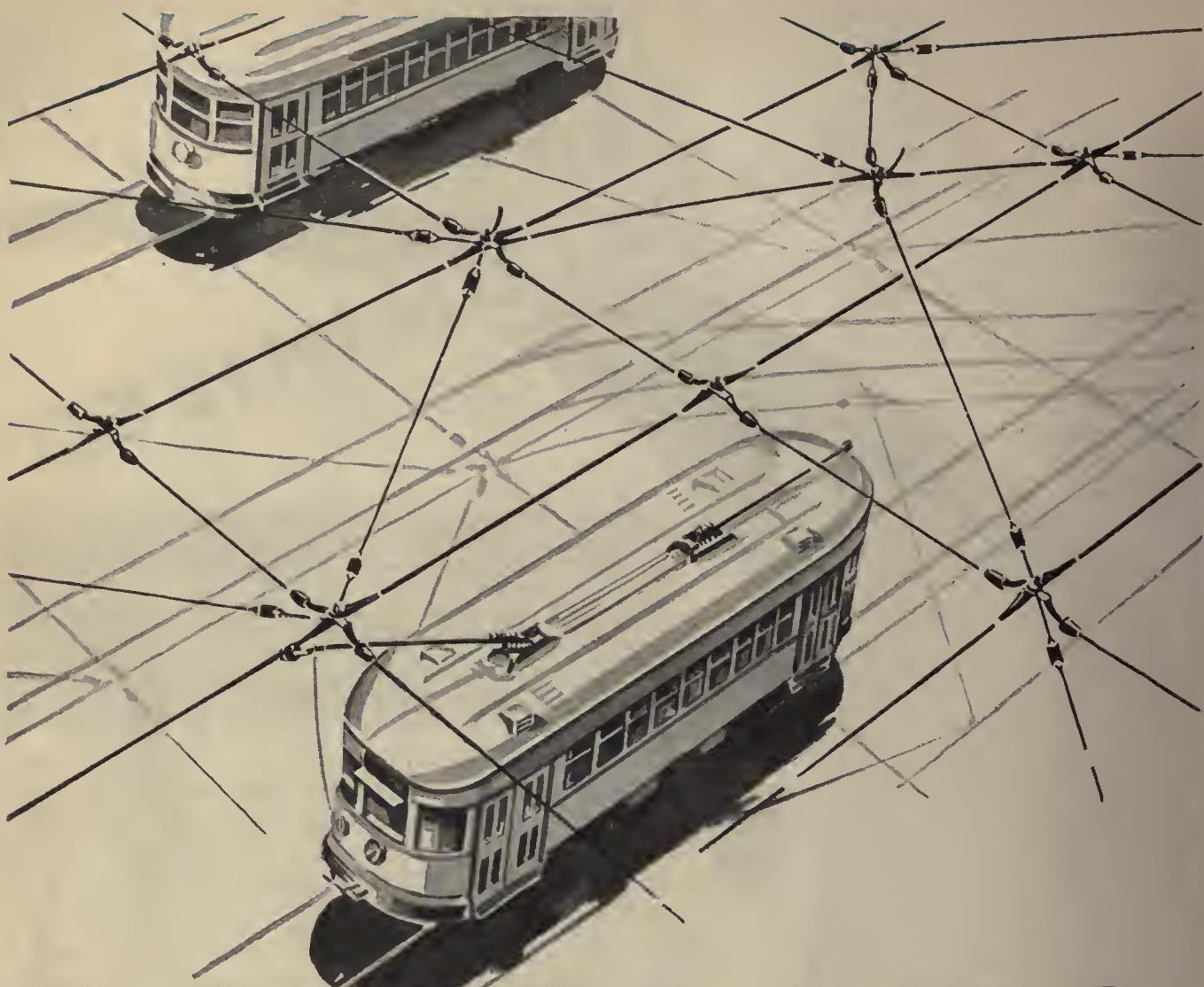
"ALUMINIZED," the average interurban car can weigh 46,000 lbs. instead of the usual 58,990 lbs. "Aluminized" cars have equal strength and are nearly 6 1/2 tons lighter. 7,450 lbs. of the light strong alloys of Alcoa Aluminum displace 20,800 lbs. of steel. Result, the "aluminized" car, lifting 389,700 ton-miles a year off your tracks, cuts power costs, wear and tear on motors, brakes, etc.

The additional cost of "aluminizing" interurban cars is absorbed in 31 months by savings in power costs alone. Based on a cost of .098 cents per 1,000 lbs. of car per mile, it costs 5.78 cents to move the old-fashioned (58,990 lbs.) car 1 mile. The "aluminized" car weighing only 46,000 lbs. costs 4.508 cents per mile. Operating the usual 60,000 miles per year of interurban work, this power saving of 1.273 cents per mile by the "aluminized" car results in a power saving of \$764 per year.

When you "aluminize" you can use the light strong alloys of Alcoa Aluminum for under-frame, including body bolsters, side sills, cross members and apparatus supports. Use it too for all metal work in the body, including side plates, end plates, roofs and finish inside and outside. It can also be used for numerous truck, motor, and apparatus parts.

Standard structural shapes of the strong alloys of Alcoa Aluminum from which street cars and railway coaches are made are carried in stock. Plates, rivets, bolts and screws are also available. The engineering handbook, "Structural Aluminum," is available at \$1.00 a copy. Address ALUMINUM COMPANY of AMERICA; 2463 Oliver Building, PITTSBURGH, PENNSYLVANIA.

ALCOA ALUMINUM



ROEBLING

TROLLEY AND CONTACT WIRE is an important Roebling product and hundreds of miles of it span the country. Yet it is merely one of many types of Roebling Electric Wires and Cables serving electric railways everywhere.

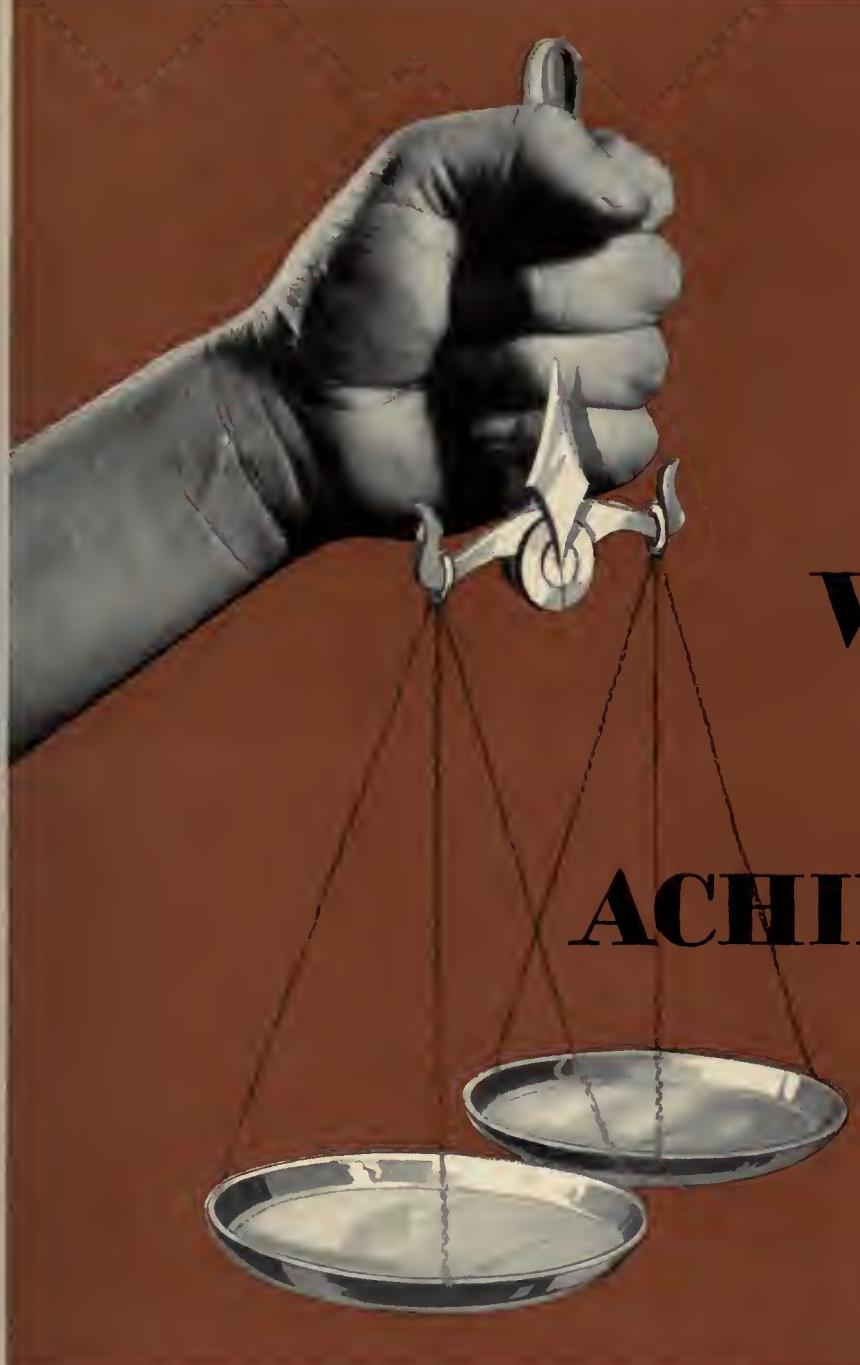
Locomotive wire, bond wires, pantograph cable, power cables, parkway cables, railway signal wires and cables—these are simply a few of the Roebling Wires and Cables made for electric railway service. There is hardly an electric wire and cable need that cannot be satisfied by the complete and diversified Roebling Line. Your inquiry for further information and prices would be welcomed by any Roebling office listed.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.

Atlanta	Boston	Chicago	Cleveland	Los Angeles	New York
Philadelphia	Portland, Ore.	San Francisco	Seattle	Export Dept., New York, N. Y.	

ELECTRICAL WIRES AND CABLES

Railway Signal Wires and Cables »
Parkway Cables » Power Cables; Paper,
Cambric, Rubber; Braided or Leaded »
Car Wire » Locomotive Wire » Bronze
Trolley and Contact Wire » Copper
Trolley and Contact Wire » Copper
Transmission Strand » Guy Wire and
Strand » Bond Wires » Ground
Wires » Welding Cable; Trailing and
Electrode Holder » And a wide variety
of other Wires and Cables.



WEIGH
these
ACHIEVEMENTS



PRESENT business conditions have created many new and perplexing problems for the motor coach industry. To successfully cope with the changed operating conditions, vehicle improvements that



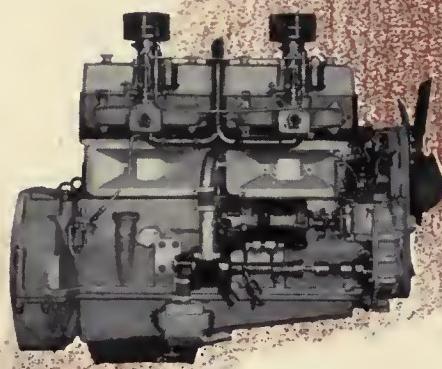
QUICK-REMOVABLE POWER PLANT . . .

Two men can remove and replace an entire power plant assembly, including radiator, engine, clutch and transmission as a unit, in the same amount of time ordinarily required to remove a single accessory.

Available in Type V, Type 250 and Type 40.

ENGINES . . .

Four engines of basically similar design but of different displacement and power range have been developed, insuring maximum interchangeability of parts, reduced inventory charges and simplified maintenance.



BRAKES . . .

The new Yellow duplex brakes, consisting of four brake shoes, simultaneously actuated by dual air brake diaphragms provide larger brake areas, insure more efficient braking, more uniform wear, longer lining life and less maintenance.

ALL-METAL BODIES . . .

Constructed of standardized and interchangeable parts and sections, precision built over jigs and fixtures, simplifies upkeep, reduces inventory requirements, provides exceptional light weight with greater strength, longer life and more revenue possibilities. Standard on Models Z-29, Z-38, Type 40 and Type 44.



will attract additional reve-

nue, increase dependability

of service and reduce costs

are essential. At a time

when any curtailment of

extensive research and engi-

neering development might

be judged excusable, Yellow

Coach has put more impetus

than ever behind the pro-

duction of new and improved

equipment and advancements

in mechanical design. The

urge to strive constantly for

perfection...to make today's

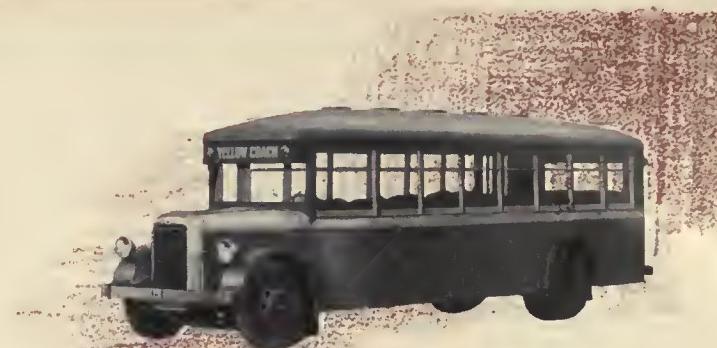
achievements superior to those

of yesterday . . . has been

responsible for many recent

developments of great im-

portance to the progress of



TYPE V . . .

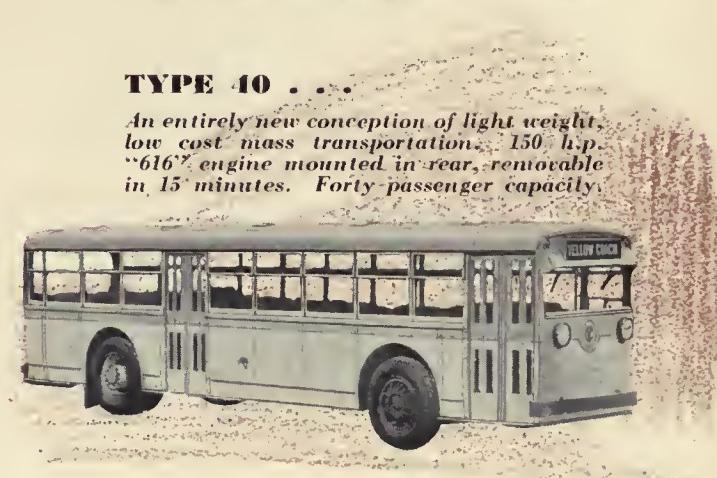
Parlor and city service coaches of intermediate capacity featuring new standards of performance and earning power.

Equipped with either 130 or 115 h.p. engines which are interchangeable. Complete power plant removable in 7½ minutes.



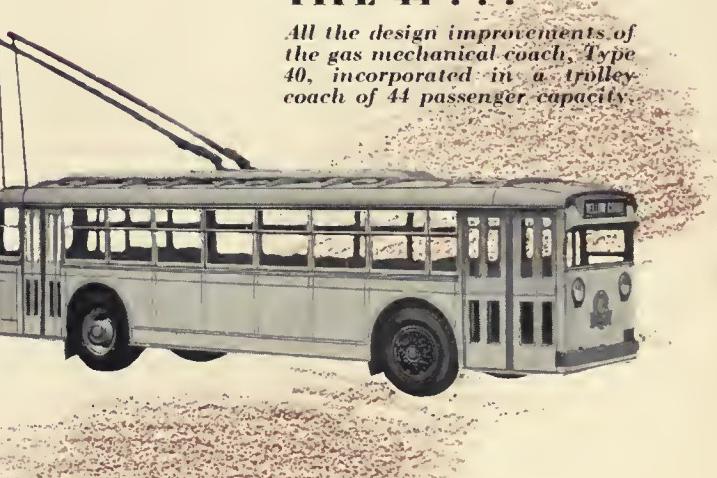
THE IMPROVED "250" . . .

A universally satisfactory 33 passenger transcontinental type coach, refined to still higher peaks of performance, reliability, long life and low-cost maintenance. Complete power plant removable in 10 minutes.



TYPE 40 . . .

An entirely new conception of light weight, low cost mass transportation. 150 h.p. "616" engine mounted in rear, removable in 15 minutes. Forty passenger capacity.



TYPE 44 . . .

All the design improvements of the gas mechanical coach, Type 40, incorporated in a trolley coach of 44 passenger capacity.

highway transportation.  **Yellow Coach has confidently con-**
tinued its development work to insure the future prosperity
of the industry and to justify the proud distinction of serving
year after year as the leading producer of motor coaches.

A Coach for Every Class of Service

TYPE	WHEEL- BASE	PASS. ITV	CAPAC-		
				CYL.	ENGINE DISPLACEMENT
U	185"	16	Low/High Headroom Parlor Coach	6	331
U	185"	21-23	City Service Coach	6	331
U	185"	21	Observation Parlor Coach	6	331
U	215"	25	City Service Coach	6	331
W	185"	16	Low/High Headroom Parlor Coach	8	353
W	185"	21-23	City Service Coach	8	353
W	185"	21	Observation Parlor Coach	8	353
W	215"	25	City Service Coach	8	353
V	225"	25	Observation Parlor Coach	6	468
V	225"	29-30	City Service Coach	6	468
V	225"	29	All Metal City Service Coach	6	468
V	225"	29	Observation Parlor Coach	6	525
Z	225"	29	All Metal City Service Coach	6	525
Z	240"	38	All Metal City Service Coach	6	616
250	250"	33	Observation Parlor Coach	6	616
40	213"	40	All Metal City Service Coach	6	616
44	213"	44	All Metal City Trolley Coach	Electric drive 35 or 50 h.p. motors	

Gas electric drive and double deck equipment also available.

GENERAL MOTORS TRUCK CO., Pontiac, Mich.
Subsidiary of Yellow Truck & Coach Mfg. Co.



say the car buyers

Test after test has definitely proved that the new Texaco System of car-journal lubrication saves money. It has been proved through years of actual service on a number of important roads. Many buyers of rolling stock in the electric railway field are now specifying this system for all new cars. Those now

in operation are rapidly being equipped. • The Texaco System, which includes the application of Texaco Oil Seals and the use of Texaco Lovis Oil as major factors, gives more effective lubrication than had before been thought possible. The savings are surprising. • Detailed facts and figures are available to any interested railway engineer. Write The Texas Company and ask to have a Texaco lubrication engineer call and show you exactly what has been done on other roads—or better yet, let him arrange with you for conclusive tests on your own cars. Find out what this Texaco System will do for you.

THE TEXAS COMPANY, 135 East 42nd Street, New York City



TEXACO
lubricants



that qualify for ANY service

No matter how exacting your service conditions may be, Carnegie Wrought Steel Wheels will more than measure up to your requirements. They are built to withstand the stress of modern traffic—peak loads, rapid acceleration and emergency stopping. The rolling and forging process by which they are manufactured imparts to the steel exceptional strength and endurance—exceptional safety.

Carnegie Wrought Steel Wheels have long been accepted as the standard of excellence under railroad passenger cars, where the service is severe and where utmost safety precautions are taken. Under electric cars they render the same safe, trouble-free, economical service. Before you invest in wheels, investigate the many advantages of Carnegie Wrought Steel Wheels.

CARNEGIE STEEL COMPANY · PITTSBURGH, PA.

Subsidiary of United States Steel Corporation



91



CARNEGIE WROUGHT STEEL WHEELS

EVIDENCE OF SERVICEABILITY IN TROLLEY POLES

STRENGTH BY SPECIAL HEAT TREATMENT

STRENGTH BY HIGH QUALITY OF STEEL

STRENGTH DUE TO SPECIAL REINFORCEMENT

STRENGTH TO MEET ALL SERVICE CONDITIONS



THE first requirement in trolley poles is adequate and lasting strength, which must be provided without excessive weight. Economy in operation of the car, efficiency in service, and safety to the public will depend on the fulfillment of this demand.

The heat-treating and other processes under which NATIONAL-SHELBY Trolley Poles are made, fully develop the potential qualities of the special, high-grade steel which has been chosen for superior strength.

The design of these poles gives complete balance, obviates undue weight, and puts maximum reinforcement where it is most needed. Every pole, before leaving the mill, undergoes the most thorough tests and inspections, to make sure that it is free from defect. Write for complete information.

NATIONAL TUBE COMPANY • Pittsburgh, Pa.
Subsidiary of United States Steel Corporation



NATIONAL SHELBY SEAMLESS POLES

The SAFETY CAR CONTROL EQUIPMENT

*—will wake up
your Drowsy Cars*

IT IS surprising how easily old cars may be given new life and energy . . . They can be converted into Safety Cars—which are safer, and FASTER, especially when equipped with the Relay Valve and the Self-Lapping Brake Valve . . . These devices assure very quick build up of brake cylinder pressure and unusually flexible control of this pressure. • • • • •

SAFETY CAR DEVICES Co.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:

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DAVIS WHEELS

"ONE-WEAR"
STEEL



What Does
It Cost
After You've
Bought It?

This is the question to ask
about wheels.

With the Davis "One-Wear" Steel
Wheel the first cost is the last.

Contour conditioning and all its
attendant expense never troubles
the Davis Wheel.

Special composition steel triple heat
treated, provides unique qualities
that are characteristic only in the
Davis Wheel and make them truly
"One-Wear."

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST.LOUIS

THEY WERE USING 1910 BOLTS ON 1931 MACHINERY



Design and materials had kept pace but obsolete, costly bolts were still used. An interesting R B & W case history

A PURCHASING AGENT for an R B & W customer asked us for prices on a type of bolt we had not made for his industry for years. We went to see what he intended to use the bolt for, and encountered a mechanical anachronism not without a vestige of humor.

A certain piece of equipment had been improved every few years, with the exception of the bolts, which remained the same type of 20 years ago, much too heavy for current requirements, and very expensive to make. The bolt had

been designed in the days before cast iron flanges were replaced by the more ductile pressed steel flanges now in use, and when other parts of the equipment were cruder than now. But no one had thought to modernize the bolt design.

Of course the customer appreciated the suggestion of the R B & W Engineering Service that a standard

bolt would serve the purpose and cost considerably less.

Has your bolt and nut design kept pace with other improvements? Does this offer an opportunity for constructive cost cutting and improved value of your products? Make the R B & W Engineering Service your Bolting Material Counsel.



RUSSELL, BURDSALL & WARD BOLT & NUT CO.

ROCK FALLS, ILL.

Sales Offices at Philadelphia, Detroit, Chicago, San Francisco, Los Angeles, Seattle, Portland, Ore.

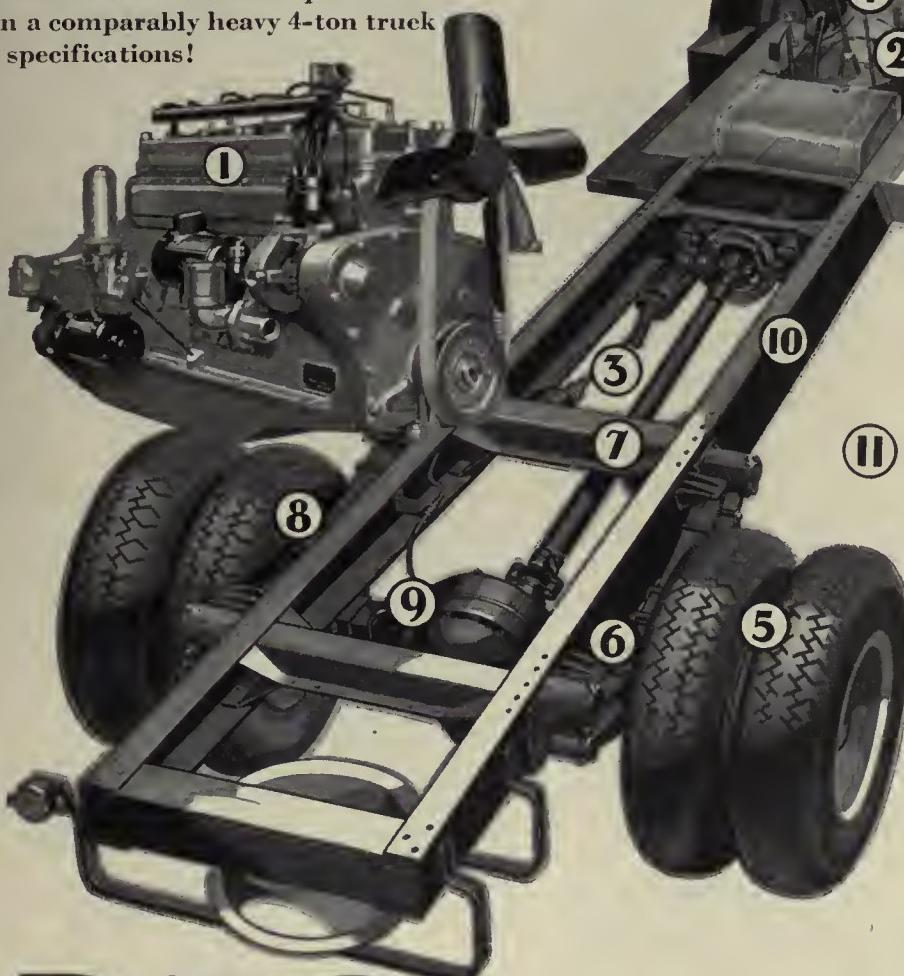
PORT CHESTER, N. Y.

CORAOPCLIS, PA.

THE NEW REO ^{BIG}4TONNER

A Truck Built to Do YOUR Job

The new Reo Big Four-Tonner is a heavy truck for heavy work, massively constructed at all vital points. It is engineered for safe and profitable high-speed travel. The Big 4-Tonner engine develops 101 h. p. at the low speed of 2600 R. P. M., has seven big main bearings, full force feed lubrication even to piston pins. The cylinder block of chrome nickel iron increases valve seat and cylinder wall life *seven times*. Built in three wheelbase lengths, from tractor to van types — offered at the lowest price ever placed on a comparably heavy 4-ton truck of equal specifications!



1. Powerful heavy duty, 101 H. P. Six Cylinder Engine.
2. Heavy Duty 4-speed Transmission.
3. Brake Booster standard equipment.
4. Chrome nickel cylinders—wearing 7 times longer than grey iron. Seven bearing crank-shaft.
5. Dual wheels standard equipment.
6. Extra long springs; helpersprings, standard equipment.
7. Frame reinforced by 7 heavy cross members.
8. Powerful 4-wheel hydraulic brakes.
9. Heavy duty full-floating rear axle.
10. Extra heavy frames. Side channels 10" deep $\frac{1}{4}$ " thick, with constant flange width of 3 inches.
11. Available in three wheelbase lengths from tractor to van type.

REO MOTOR CAR COMPANY
LANSING — TORONTO

150-inch wheelbase chassis	\$2800
170-inch wheelbase chassis	\$2875
190-inch wheelbase chassis	\$2950

f. o. b. Lansing

REO
BIG 4TONNER \$2800

**REDUCES COST
32¢ PER 1000 CAR MILES
WITH NEW LUBRICANT**



*High speed
train running
sixty miles
an hour.*

FLYING over the rails . . . at sixty and sometimes seventy miles an hour . . . the trains of one large high speed electric railway system* had long been subject to excessive bearing failures.

For the past ten months this company has operated all cars with L. C. Motor Journal Oil. A recent check up for this period of operation showed practically complete elimination of hot boxes. It discloses a saving of waste consumption for the first five months of \$1,001.00 and \$497.00 saved in journal brasses consumption. A total saving of nearly 32 cents per thousand car miles has been accomplished.

On other high speed lines and in ordinary

street car service Standard Oil Company (Indiana) lubricants and service have proved equally successful. In practically every instance marked savings have been made in power and waste consumption with an attending increase in the life of bearings and a reduction in bearing temperatures.

You will find it profitable to investigate L. C. Motor Journal Oil. Our engineers will be glad to furnish information and data. Address your request to the Electric Railway Division.

*Name on request.

STANDARD OIL COMPANY

(Indiana)

910 So. Michigan Avenue

Chicago, Illinois

**L. C. MOTOR
JOURNAL OIL**

THE IDEAL YEAR AROUND MOTOR JOURNAL OIL FOR ELECTRIC RAILWAY SERVICE

THERE

...and back
the same way

*Karpen Comfort
sells the round trip*



KARPEN

It's the Seating that Counts



No. 308

THE KARPEN SAFE-T-GRIP

Patent
Applied
For

SafeTTMGrip



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No. 100



A GOOD seat brings the rider back the same route. The seat is the "point of contact" between the rider and the transportation. It influences in a large measure the choice of the return trip. It's the seating that counts . . . Make this test yourself, the next time you decide on seat-

ing for bus, street car or interurban, for new construction or replacement. Compare Karpen comfort with other seating. Judge its eye-value for your transportation. And remember the most important factor of all—Karpen has been building good transportation seating for 37 years.

S. KARPEN & BROS.

Transportation Seating Dept., Chicago

Michigan City, Ind.

Los Angeles

New York

KARPEN

It's the Seating that Counts



HERE'S A FLUTED STEEL POLE FOR EVERY TYPE OF SERVICE



In Los Angeles, Union Metal Poles support trolley span wires, street lights and distribution lines.

TWENTY-FOOT Fluted Steel Poles for trolley span wire support—sturdy thirty-footers for distribution lines—double thick steel for unusually heavy loading—fifty and sixty-foot poles for cross-country lines. In short, strength and height to meet every pole requirement . . . And for city streets, where appearance is especially important, ornamental pole bases can be supplied in a wide variety of designs.

The application of Union Metal Poles is almost unlimited.

Wherever wires are strung overhead, Fluted Steel Poles can do the supporting job, and do it efficiently.

Union Metal Poles are made in one piece from high grade steel, welded with a vertical seam and then cold-rolled. In poles up to forty feet in height there are no horizontal joints to collect moisture and hasten corrosion . . . Fluted Steel Poles take standard fittings, are easily adaptable to unusual requirements and will last for years without heavy upkeep expense.

THE UNION METAL MANUFACTURING CO., General Offices and Factory: CANTON, OHIO
Sales Offices: New York, Chicago, Boston, Los Angeles, San Francisco,
Dallas, Atlanta

● Distributors: Graybar Electric Company, Inc.; General Electric Merchandise Distributors. Offices in all principal cities.

Abroad: The Canadian General Electric Co., The International General Electric Co., Inc.



UNION METAL DISTRIBUTION POLES



Is it good engineering?



*... to court failure in time
or to insure success from the start?*

Competent engineers claim that there are eleven movements possible in an ordinary paved track structure resulting from as many more contributing causes, each one of which may cause the failure of the structure. These men recognize that even with the most careful engineering and construction, it is impossible to assure against such failure.

With DAYTON TIES, however, only 2 of these 11 movements are possible—*deflection between supports and rail vibration* . . . of these 2, the first permits the DAYTON TIE to exercise its full function, while the second is com-

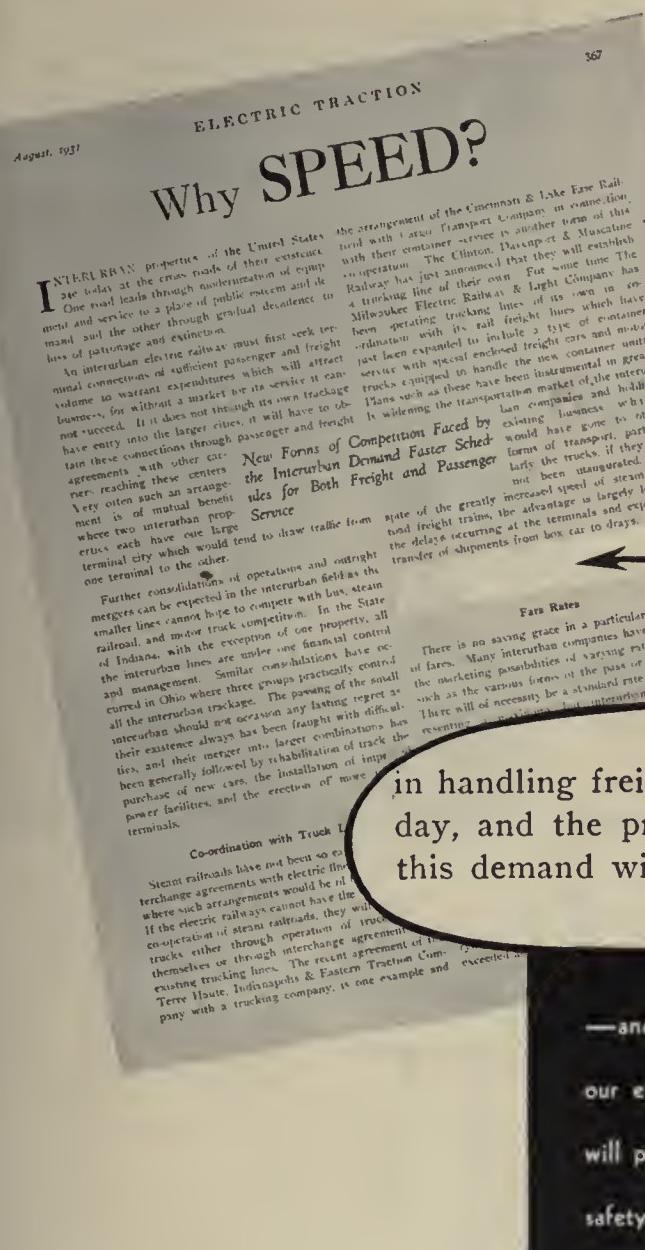
pletely absorbed in the Dayton asphalt cushion tie block.

The varying traffic conditions of 20 years have yet failed to reveal the slightest rail movement or substructure disintegration where DAYTON TIES have been used.

Is it good engineering—is it sound economy to court failure in time or to insure success at the start—Isn't the answer obvious?

THE DAYTON MECHANICAL TIE CO.
DAYTON, OHIO

The better tie . . . without an alibi



WE REPEAT —

“Why
SPEED?”

Fares Rates

There is no saving grace in a particular standard of fares. Many interurban companies have not tried the marketing possibilities of varying rates of fare, such as the various forms of the pass or zone fares. There will of necessity be a standard rate of fare representing the minimum, but interurban companies

New Forms of Competition Faced by

the Interurban Demand Faster Sched

ule for Both Freight and Passenger

Service

where two interurban prop

erties each have one large

terminal city which would tend to draw traffic from

one terminal to the other.

Further consolidations of operations and outright

mergers can be expected in the interurban field as the smaller lines cannot hope to compete with bus, steam railroad, and motor truck competition. In the State

of Indiana, with the exception of one property, all the interurban lines are under one financial control

and management. Similar consolidations have oc-

curred in Ohio where three groups practically control

all the interurban trackage. The passing of the small

interurban should not occasion any lasting regret as

their existence always has been fraught with diffi-

culties, and their merger into larger combinations has

been generally followed by rehabilitation of track, pur-

chase of new cars, the installation of more

power facilities, and the erection of more

terminals.

Co-ordination with Truck L

Steam railroads have not been so ex-
tremely agreements with electric lines
where such arrangements would be in-
convenient. If the electric railways cannot have the
en-operation of steam railroads, they will
use trucks either through operation of trucks
themselves or through interchange of trucks
existing trucking lines. The recent agreement of the
Terre Haute, Indianapolis & Eastern Traction Com-
pany with a trucking company, is one example and

in handling freight shipments is of vital necessity to-
day, and the progressive interurban which caters to
this demand will profit by it.

—and the progressive interurbans which consult with
our engineers as to how "Union" Automatic Signals
will permit them to attain such increased speeds with
safety, will also benefit thereby. There is no obligation.



1881



Union Switch & Signal Co. 

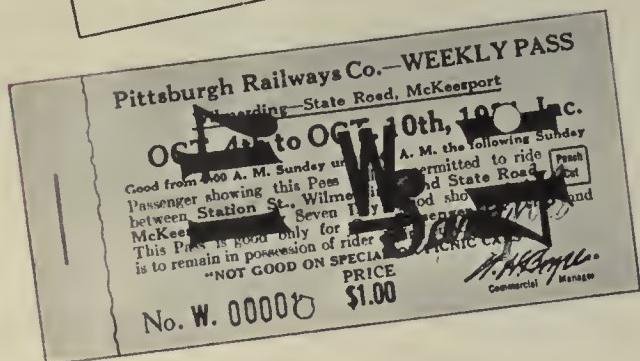
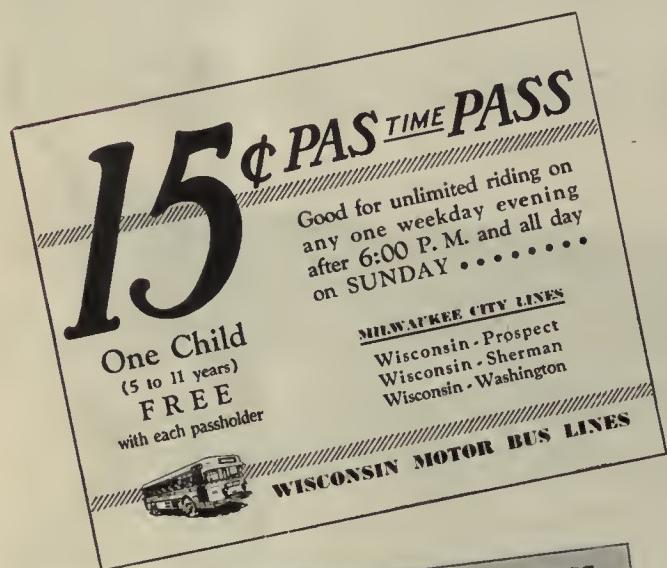
SWISSVALE, PA.

1931

Milwaukee and Pittsburgh

believe in offering
bargains for
passengers . . .

*Statistics prove they
get the passengers*



Pittsburgh—featured in a former
Globe advertisement has achieved
similar results. Write for our ex-
perience on this subject of passes.

Quoted from "The Business Week"

The necessity of maintaining street railway traffic has mothered many merchandising innovations. Outstanding are the "bargain fares" which the Milwaukee Electric Railway & Light Company has introduced. The weekly pass has proved very popular. It costs \$1.00, is transferable and is good for any number of rides. Around 50% of revenue now comes from this source, says "Electric Railway Journal." The 10c. cash fares account for 16%, while the 6-trip tickets, worth 50c. bring in 17% of receipts. More people go home for lunch from downtown, and short-haul traffic has increased. Wide use of the pass has increased speed of operation.

Last Christmas a 75c. pass was put on sale, and about 3,000 were bought each week.

Later a 75c. shopper-theatre pass was introduced and is still being used. This ticket is good from 9 a.m. to 4 p.m. and after 7 p.m. weekdays, after 9 a.m. Saturdays and all day Sundays. On an average, about 1,800 shopper-theatre passes are in use weekly.

"Pastime Pass" This summer an attractive 50c. night pass was put into effect to induce people to take interurban rides for recreation. Another innovation was the 15c. "pastime pass," which with an additional cash payment of 10c. is good for unlimited riding in the evening on de luxe city buses.

**GLORE
TICKET COMPANY
PHILADELPHIA**

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Boston	New York
	Atlanta

SALES OFFICES:

Cincinnati	Pittsburgh
Baltimore	Cleveland
St. Louis	Des Moines

Globe TICKETS...TRANSFERS...PASSES

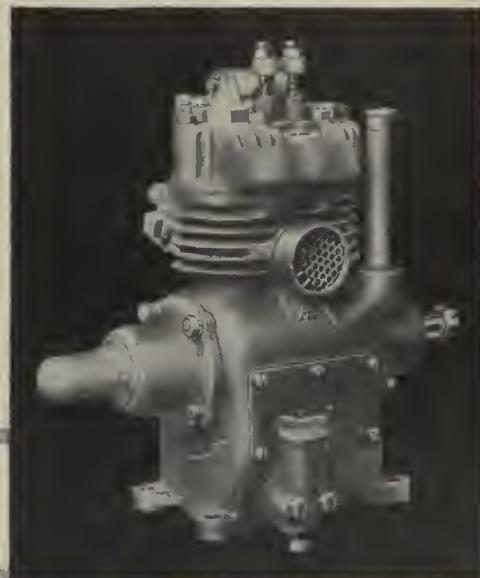


BRAKES and the modern TRAILER TRAIN

No need to stress the fact that trailer train operation is a rapidly growing, decidedly economical form of modern highway transportation . . . Likewise there is little necessity to explain the obviously indispensable place brakes by Bendix-Westinghouse hold in the success of this important branch of highway commerce.

* Universally accepted as the standard control for modern heavy-duty transport units, Bendix-Westinghouse Automotive Air Brakes, in their unchallenged success, are merely maintaining a confidence born of a manufacturing background of more than a half century * Lightning quick, powerful, traditionally dependable, Bendix-Westinghouse control is something more than just a brake . . . This modern equipment assures constantly perfect equalization of braking pressures, greatly lengthens periods between adjustments, increases lining life, provides an automatic safety feature in case of a break-away, at any point, in train operation and makes every truck or tractor a potential trailer carrier * Write today for more specific information regarding the countless advantages of modern Air Brake Control . . . Address BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY at Pittsburgh, Penna.

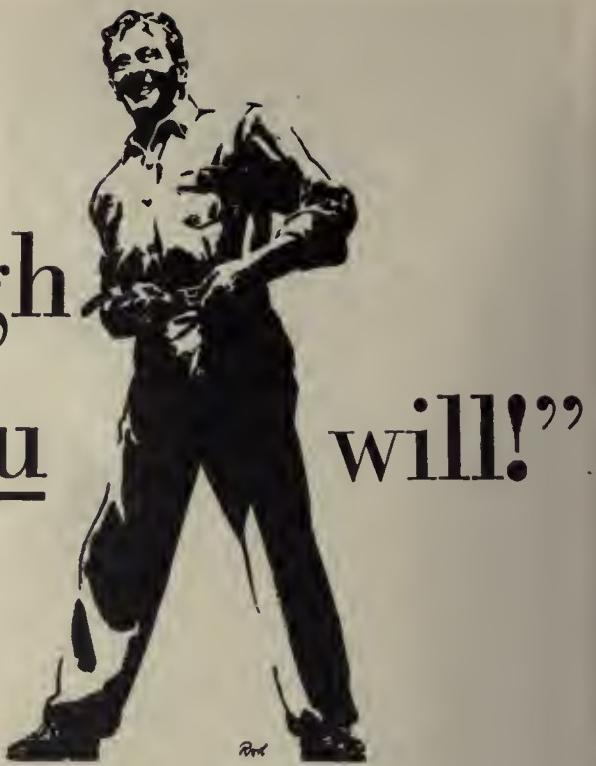
6296



BENDIX • WESTINGHOUSE

AUTOMOTIVE • AIR • BRAKES

"I'll see it through if you will!"



"**T**HEY tell me there's five or six million of us—out of jobs.

"I know that's not your fault, any more than it is mine.

"But that doesn't change the fact that some of us right now are in a pretty tough spot—with families to worry about—and a workless winter ahead.

"Understand, we're not begging. We'd rather have a job than anything else you can give us.

"We're not scared, either. If you think the good old U. S. A. is in a bad way more than temporarily, just try to figure out some other place you'd rather be.

"But, until times do loosen up, we've got to have a little help.

"So I'm asking *you* to give us a lift, just as I would give one to you if I stood in your shoes and you in mine.

"Now don't send me any money—that isn't the idea. Don't even send any to the Committee which signs this appeal.

"The best way to help us is to give as generously as you can to your local welfare and charity organizations, your community chest or your emergency relief committee if you have one.

"That's my story, the rest is up to you.

"I'll see it through—if you will!"

—Unemployed, 1931

THE PRESIDENT'S ORGANIZATION ON UNEMPLOYMENT RELIEF

*Walter S. Gifford
Director*

COMMITTEE ON MOBILIZATION OF RELIEF RESOURCES

*Owen D. Young
Chairman*

The President's Organization on Unemployment Relief is non-political and non-sectarian. Its purpose is to aid local welfare and relief agencies everywhere to provide for local needs. All facilities for the nationwide program, including this advertisement, have been furnished to the Committee without cost.

BY THIS SIGN YOU WILL KNOW THEM



TRADE MARK

SYMBOL OF A COMPLETELY OWNED OPERATION FROM TREE TO LOADED CAR

This Warranty Mark signifies Dense Long Leaf Yellow Pine, correctly seasoned and uniformly graded, and it is branded on every piece of Jackson stock.

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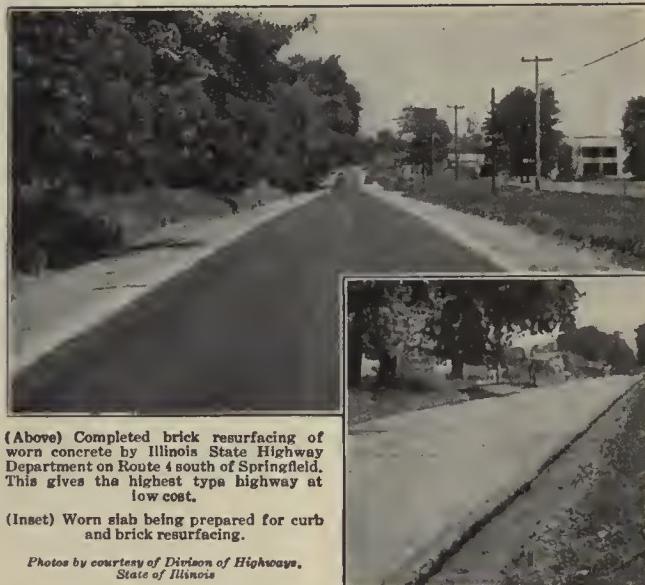
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Manufacturers

Lockhart, Alabama

A CROSSETT WATZEK GATES INDUSTRY

Illinois Resurfaces 63 $\frac{2}{3}$ MILES WITH BRICK



(Above) Completed brick resurfacing of worn concrete by Illinois State Highway Department on Route 4 south of Springfield. This gives the highest type highway at low cost.

(Inset) Worn slab being prepared for curb and brick resurfacing.

*Photos by courtesy of Division of Highways,
State of Illinois*

ILLINOIS began a brilliant chapter in highway economy this year, by widening and resurfacing worn concrete roads with brick.

A total of 63.23 miles constituted the initial program.

Thus, slabs that have not too far approached the end of their usefulness are being saved for many years to come. Brick pavements built 30 and 40 years ago are in constant use today, although not nearly so well constructed as these Illinois brick resurfaced sections.

The economy and sound judgment in resurfacing with brick is apparent. The worn concrete—unsatisfactory as a pavement—will make a good base on a subgrade that has received its full settlement. Mastic cushion and bituminous filled brick surface prevent transmission of cracks. Weather and traffic will have no effect on the brick surface. The existing slab has been transformed into a low-maintenance road extraordinarily well suited to all traffic.

Highway engineers, officials and taxpayers will find much of interest in this Illinois work.

Further information on resurfacing with brick may be had by addressing the National Paving Brick Association, 1245 National Press Building, Washington, D. C.



FIRST ELECTRIC TRAIN ~ 1893

THE first electric train was operated in Chicago in 1893 at the World's Fair.

Mr. J. S. Doyle, now of the Interborough Rapid Transit Company of New York, supervised the installation of the wiring on this train and used Okonite wire and Okonite and Manson tapes throughout. This train was the forerunner



**ALL
ISN'T
GOLD . . .**

THE thought contained in that old saying "All is not gold that glitters" may well be applied to trolley wheels.

It takes the finest in materials and workmanship to produce Kalamazoo Trolley Wheels. They always provide ample conductivity and resist the wear caused by pounding against trolley ears.

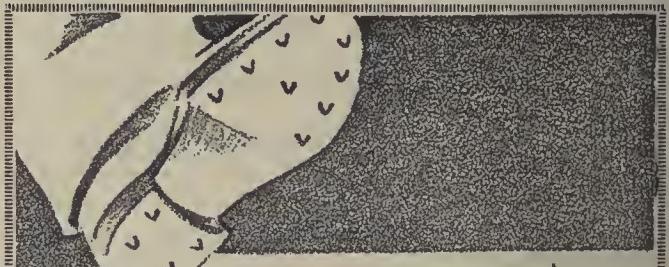
Let us tell you why we have supplied continuously for over 25 years, many of the country's leading Electric Railways.

THE STAR BRASS WORKS

Kalamazoo
Michigan



KALAMAZOO



TUCOLITH
FLEXOLITH
Long Wearing

Even the rough brogans of stamping workmen do not injure the hard, tough surface of Tucolith floors.

- 6 REASONS WHY**
- Tucolith is the popular flooring material for cars and busses.
 - 1. Long Life
 - 2. Attractive
 - 3. Non-Slip Surface
 - 4. Fireproof
 - 5. Sound Deadence
 - 6. Sanitary

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30 CHURCH ST., NEW YORK
PEOPLES GAS BLDG.
122 S. MICHIGAN AVE., CHICAGO



of all of the heavy traction lines in the world — subway or elevated. Even as they demanded the best of wire and tape in 1893, so do their successors today. Thus Okonite is found wherever severe operating conditions exist,

THE OKONITE COMPANY

Founded 1878

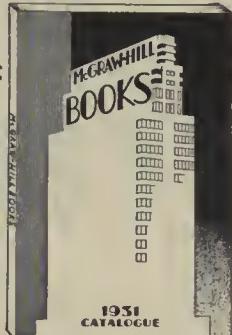
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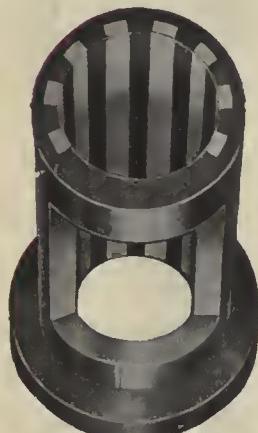
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**NACHOD Headway
RECORDERS**

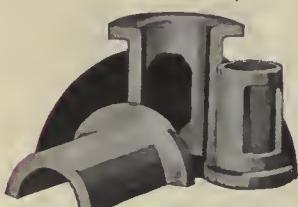
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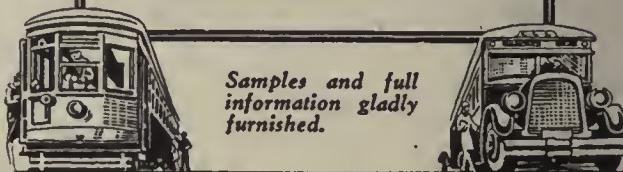
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—the car curtain and upholstery material that pays back its cost by many added years of service. Since 1897 there has been no substitute for Pantasote.

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for electric railway cars
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*Samples and full
information gladly
furnished.*

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NEW YORK

*November
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and plates will enable
us to serve you best—
to furnish proofs in
ample time so changes
or corrections may be
made if desired.

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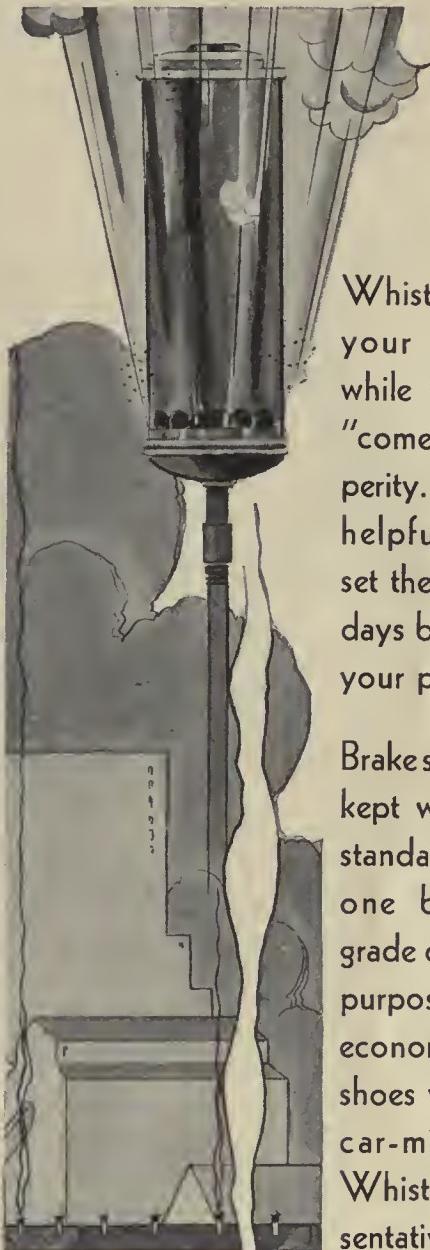
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For over 50 years Silver Lake Trolley and Bell Cords have met these requirements. Today they are even more accurately fitted to their jobs.

Write for samples.

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Newtonville, Mass.

Whistling Helps



Whistling to keep up your courage helps while waiting for the "comeback" of prosperity. It is far more helpful, however, to set the stage for better days by keeping down your present costs.

Brake shoe costs can be kept well in hand by standardizing on the one best type and grade of shoe for every purpose. There's no economy in low priced shoes which raise your car-mile costs.

Whistle for our representative who will be glad to furnish you with facts and figures.

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BUS operators can't afford to run the risks of frozen radiators . . . tied-up rolling stock, costly repairs! Some safeguard against freezing must be taken . . .

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ALPHABETICAL INDEX

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

	Page
Allied Engineers.....	62
Aluminum Co., of America.....	35
American Brake Shoe & Foundry Co.....	61
American Car Co.....	Third Cover
American Steel Foundries.....	45
Art Rattan Works, Inc.....	8
Beeler Organization.....	62
Bendix Westinghouse Automotive Air Brake Co.....	55
Bethlehem Steel Co.....	22
Bibbins, J. Roland.....	62
Brill Co., The J. G.....	Third Cover
Buchanan & Laying Corp.....	62
Bylesby Eng. Manag. Corp.....	62
Cities Service Co.....	23
Collier, Inc., Barron G.....	32-33
Consolidated Car Heating Co.....	63
Cotta-A-Lap Co., The.....	19
Dayton Mechanical Tie Co.....	52
Electric Railway Improvement Co.....	63
Electric Service Supplies Co.....	9
Electric Storage Battery Co.....	17
Fargo Motor Corp.....	20-21
Firestone Tire & Rubber Co., The.....	30
General Electric Co.....	Back Cover & 10
General Motors Truck Co.....	Front Cover & Insert 37-40
General Steel Castings Co.....	16
Globe Ticket Co.....	54
Goodyear Tire & Rubber Co.....	12-13
Hemingray Glass Co.....	63
Hemphill & Wells.....	62
Jackson Lumber Co.....	57
Jackson, Walter.....	62
Johns Manville	66
Karpfen & Bros., S.....	Insert 49-50
Kelker, Jr., R. F.....	62
Kuhlman Car Co.....	Third Cover
McGraw-Hill Book Co., Inc.....	59
Metal & Thermite Corp.....	14-15
Nachod and U. S. Signal Co.....	59
National Bearing Metals Corp.....	60
National Brake Co., Inc.....	11
National Paving Brick Ass'n.....	57
National Pneumatic Co.....	7
National Tube Co.....	43
Ohio Brass Co.....	6
Oakite Products, Inc.....	64
Oakonite Co., The.....	58-59
Oakonite-Callender Cable Co., The.....	58-59
Paraffine Companies Inc., The	19
Pantasote Co., Inc., The.....	60
Railway Track-work Co.....	4
Railway Utility Co.....	29
Reo Motor Car Co.....	47
Richey, Albert.....	62
Roeblings Sons Co., John A.....	36
Russell, Burdsall & Ward Bolt & Nut Co.....	46
Safety Car Devices Co.....	44
Sanderson & Porter.....	62
Searchlight Section.....	65
Standard Oil Co., (Indiana).....	48
Standard Oil Co. of New York.....	18
Standard Steel Works Co.....	34
Star Brass Works, The	58
Silver Lake Co.....	61
Stuki Co., A.....	61
Texas Co., The	41
Timken Detroit Axle Co.....	31
Twin Coach Corp.....	Insert 25-28
Tuco Products Corp.....	58
Union Metal Mfg. Co., The	51
Union Switch & Signal Co.....	53
Wason Mfg. Corp.....	Third Cover
Westinghouse Elec. & Mfg. Co.....	Second Cover
Westinghouse Traction Brake Co.....	5
Wish Service, The P. Edw.....	62
Yellow Coach	Front Cover & Insert 37-40
 Searchlight Section — Classified Advertising	
EQUIPMENT (Used, etc.)	65
Eastern Massachusetts Str. Ry. Co.....	65
Perry, Buxton, Doane Co.....	65
POSITIONS VACANT AND WANTED	65

SEARCHLIGHT SECTION

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R.J.

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Then—isn't this
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advertise any busi-
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BUSINESS**

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Let us handle this for you. We specialize in buying and dismantling entire railroads, street railways, industrial and public service properties which have ceased operation. We furnish expert appraisals on all such properties.

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2—4-motor Freight Cars, each equipped with Westinghouse 557, 150-hp. Motors, HL control, automatic air brakes.

1—300 kw., 33,000/445 volt, 60 cycle, 600 volt, D.C., Westinghouse Automatic Substation.

2—500 kw., 33,000/445 volt, 60 cycle 600 volt, D.C., Westinghouse Automatic Substations.

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10—Standard Interurban Box Cars.

Terms can be arranged.

FS-258, Electric Railway Journal, 520 No. Michigan Ave., Chicago, Ill.

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POSITION VACANT

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FOR SALE

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Four Motor Shear

Snow Plows

First Class Condition

Also 85

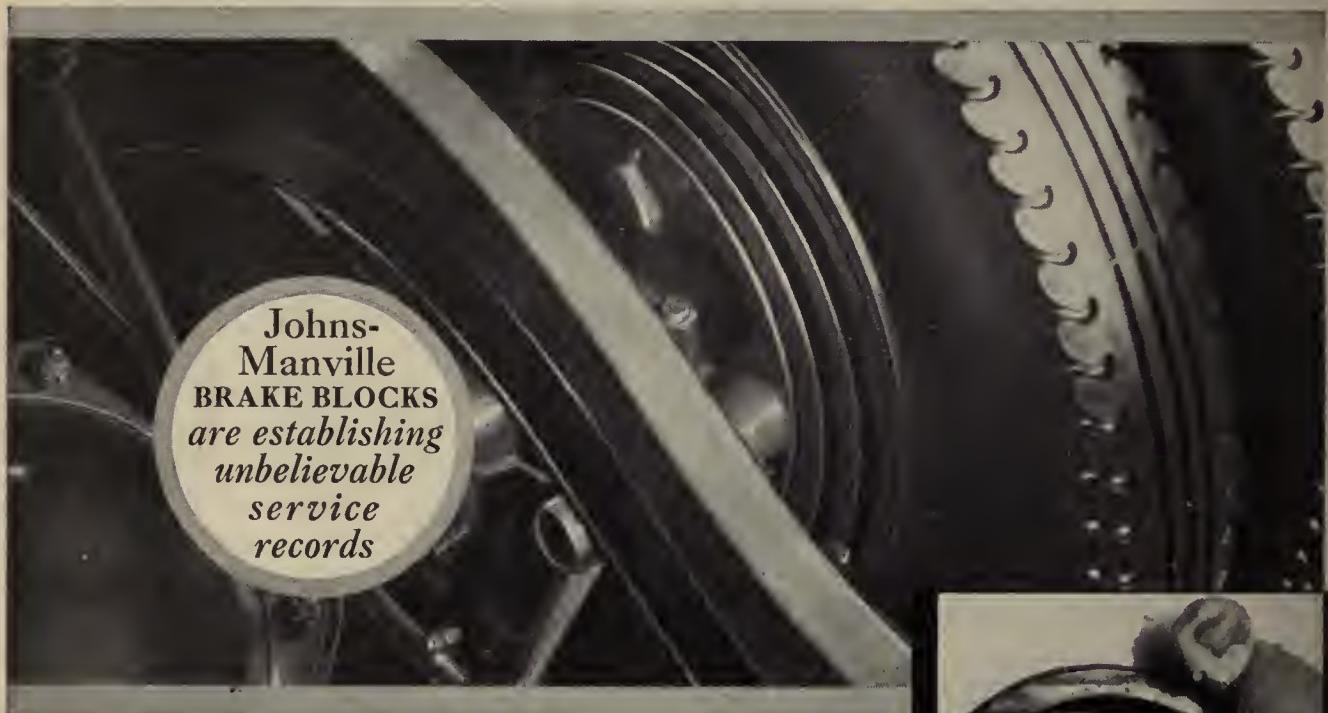
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Prices Reasonable

Eastern Massachusetts
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Boston

650,000 SAFE... *quick*... *quiet* *STOPS*



STOPS at high speed—stops at low speed—stops with the brakes hot—stops with them cold—25,000 miles of stops through the congested traffic of a busy eastern city. And this set of Johns-Manville Brake Blocks is still in good condition, ready for thousands of miles more of cost-free operation.

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concerned with keeping costs down should investigate this modern tested friction material. Address: Johns-Manville, New York, St. Louis, San Francisco, Cleveland, Chicago, Philadelphia, Montreal.

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Bus & Car Insulation
Tile Flooring

Asbestos Exhaust Pipe Covering

SERVICE TO BUS
TRANSPORTATION

Packings
Friction Tape

Mastiloke & Truss Plate Flooring
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AN EXHIBIT OF PROGRESS

THE Brill Convention Exhibit presented many new developments, the results of continued efforts to provide equipment measuring up to the highest standards of performance and maintenance.

PHILADELPHIA & WESTERN HI-SPEED CAR

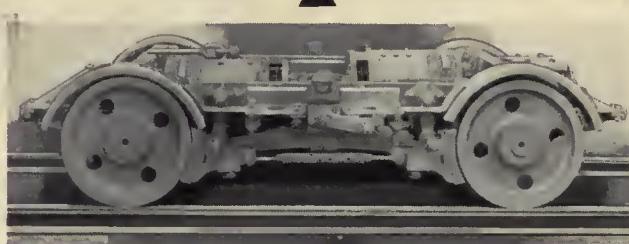
After extensive wind tunnel tests, which demonstrated the power economies possible, this highly stream-lined car design was developed. Equipped with four 100 H.P. motors, it weighs only 52,400 lbs.



Aluminum alloys principally used in construction

NEW BRILL 90-E WORM-DRIVE TRUCK

This low-level, light-weight truck has inside-hung, high-speed motors and worm-type drive for smooth, comfortable and quiet operation.



Low unsprung weight features new 90-E Truck

NEW DESIGN FOR BRILL TROLLEY BUSES

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One of five Brill 40-passenger Trolley Buses for Peoria

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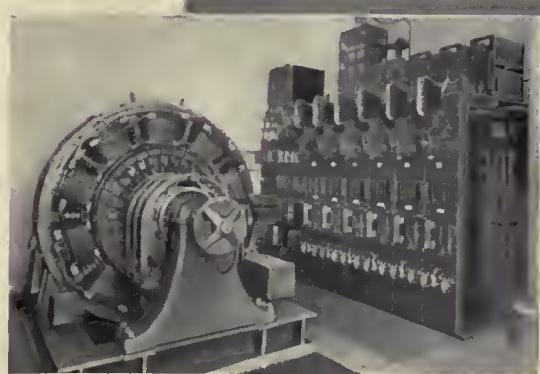
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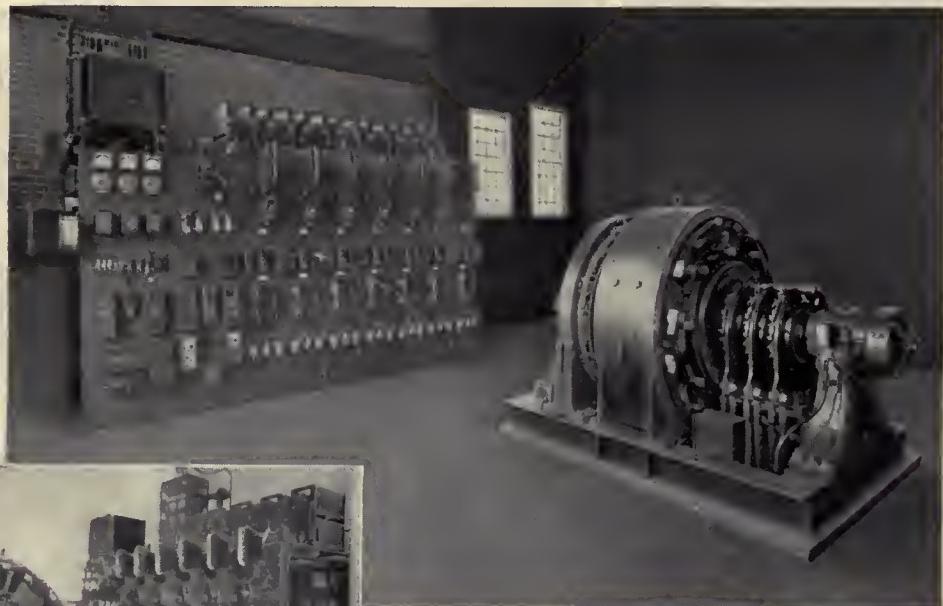
THE J. G. BRILL COMPANY OF OHIO - CLEVELAND
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CARS - TRUCKS - TROLLEY BUSES

Omaha's street railway *modernized* its power supply with G-E automatic equipment



Exterior of one of the substations



Interiors of two G-E equipped automatic substations operated by Omaha and Council Bluffs Street Railway

BY ESTABLISHING nine automatic synchronous-converter substations, completely G-E equipped, the Omaha and Council Bluffs Street Railway Company has realized these principal advantages:

Reduced substation operating expense

Saving in power

- (a) through improved distribution
- (b) through load-responsive automatic control

Improved voltage regulation resulting in faster acceleration and higher schedule speeds

Better public relations due to modern equipment and better morale of car operators

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130-31

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

ELECTRIC RAILWAY JOURNAL

MORRIS BLOCH
Engineering Editor
GEORGE J. MAGMURRAY
CLIFFORD A. FAUST
CHARLES J. ROGOI

LOUIS F. STOLL
Publishing Director

Vol. 75, No. 12

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Established 1884—McGraw-Hill Publishing Company, Inc.

JOHN A. MILLER, Editor

Pages 621-670

JOSEPH R. STAUFFER
Chicago
PAUL WOOTON
Washington
W. C. HESTON
Pacific Coast Editor
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London, England

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January issue
thoroughly!*

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1931

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Contents of This Issue

NOVEMBER, 1931

Copyright, 1931, by McGraw-Hill Publishing Company, Inc.

Editorials	621
Transportation—a Fundamental of Land Values..... By MARK LEVY	624
Auto-Transformers Feed Reading Electrified System..... By A. I. TOTTEN	626
Higher Maintenance Standards and Lower Costs Are Objectives at Atlanta	627
Car Research Progressing.....	639
Montreal Tramways Extends Use of Mercury Rectifiers..... By M. L. DE ANGELIS	642
Public Sentiment Favors Loading Platforms in Cincinnati.....	644
Trolley Bus System Will Soon Serve Kenosha.....	645
Warning Sign Reduces Accidents.....	646
Sunday Passes Increase Riding and Revenue in New Bedford..... By HAROLD E. POTTER	647
Concrete Loading Platforms at Pittsburgh.....	648
The Readers' Forum	648
Practical Ideas for the Maintenance Man:	
H-B Lifeguard Assembly—By R. Walker and H. Smith... 650	
Repairing Porcelains of Junction Boxes—By Farrell Tip- ton	650
Rebuilding Tap Bolt Holes for Motor Housings— By J. Mondoux..... 650	
Armature End Play Calipers —By H. Cordell..... 651	
Brake Valve Handle Fastener —By A. R. Petrie..... 651	
Tread Guard Placed at Frog Joint—By E. B. Spenser... 652	
Jack Handling Truck— By A. F. Pollard..... 652	
Electrically Driven Fare Box —By Charles Herms..... 652	
Handy Wrench Rack..... 653	
Automatic Block Signals Limit Freight Traffic Across Bridge —By H. A. Brown..... 653	
Dipping Tank Saves Paint— By W. R. McRae..... 653	
New Equipment for the Railways' Use.....	654
Trend of Revenues and Expenses.....	656
News of the Industry	658



Did you get your copy at the Convention?

Here is a booklet dealing with the most recent methods employed to improve braking performance on street railway cars, viz., quick brake applications with a Relay Valve, flexible control of cylinder pressure with a Self-lapping Brake Valve, and High Braking Ratio with adequate size brake cylinder . . . It also gives results of tests conducted on a prominent railway property with cars having these improvements, which indicate a remarkable shortening of stopping time and distance with the consequent improvement in schedule speed and operating safety . . . If you did not obtain a copy of this booklet at the convention write for Publication 9076. It may suggest the possibility of like improvement on your property.

WESTINGHOUSE TRACTION BRAKE COMPANY
General Office and Works » » Wilmerding, Pa.

(2258)

WESTINGHOUSE TRACTION BRAKES



Congratulations.... Georgia Power Company

Winner of Electric Railway Journal's Maintenance Award

Efficient inspection and maintenance methods have resulted in an enviable record for the Atlanta Division of the Georgia Power Company.

Moreover, modern equipment has enabled this progressive Southern property to provide safe, fast and economical transportation.

70% of Atlanta's street cars are operated by one man and equipped with N.P. Automatic Treadle Operated Exit Doors. These cars have proved 35.7% safer, 9% faster and infinitely more economical to operate than two-man cars.

"IT PAYS TO MODERNIZE"

NATIONAL PNEUMATIC COMPANY



The
NEW
 "L*C*O" Principle of Design
makes the
 O-B
Shoe and Harp really NEW

WITH the splendid cooperation of electric railway engineers and executives extending over the past three years, O-B engineers have succeeded in developing an entirely new but thoroughly proved, trolley shoe and harp. Newly applying well established principles of mechanics, the result is a shoe as radically different in design and appearance as it is in performance. In the O-B Trolley Shoe design the center of oscillation has been made coincident with the line of sliding contact on the wire.

From this important principle flow certain results which are of vital importance to the performance of the device. Mechanical simplicity, always necessary and desirable in devices involving movement, has been attained. The O-B shoe and harp consists of but four simple parts: shoe, "L*C*O" bearing, copper shunt, Flecto iron harp. All tendency toward rotation when the car moves forward or backward is eliminated. The shoe itself is always in practically perfect balance regardless of service conditions or degree of wear in the shoe. The possibility of drawing current through a point contact is never present. The full 2½-inches of sliding contact surface are constantly on the wire. Easy backing without manual guidance of the trolley pole is permitted. Wear on shoe and overhead is reduced. Noise in operation is negligible as are burning, arcing and radio interference.

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1450C

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■ ■ ■
“THE WHOLE IS EQUAL
TO THE SUM OF ITS PARTS”
■ ■ ■

**These Keystone Car and Bus
Specialties contributed to
Georgia Power Company's
fine record!*

- * GOLDEN GLOW HEADLIGHTS
- * KEYSTONE LIGHTING FIXTURES
- * HUNTER DESTINATION AND ROUTE SIGNS
- * FARADAY PASSENGER SIGNAL SYSTEMS
- * NOLCO TROLLEY-WHEELS
- * SHELBY TROLLEY-POLES
- * KEYSTONE LIGHTNING ARRESTERS

As manufacturers of Keystone Car and Bus Equipment, we are proud to acknowledge the compliment paid us by Georgia Power Company. We are glad that Keystone Equipment was helpful in their cost-reducing program.

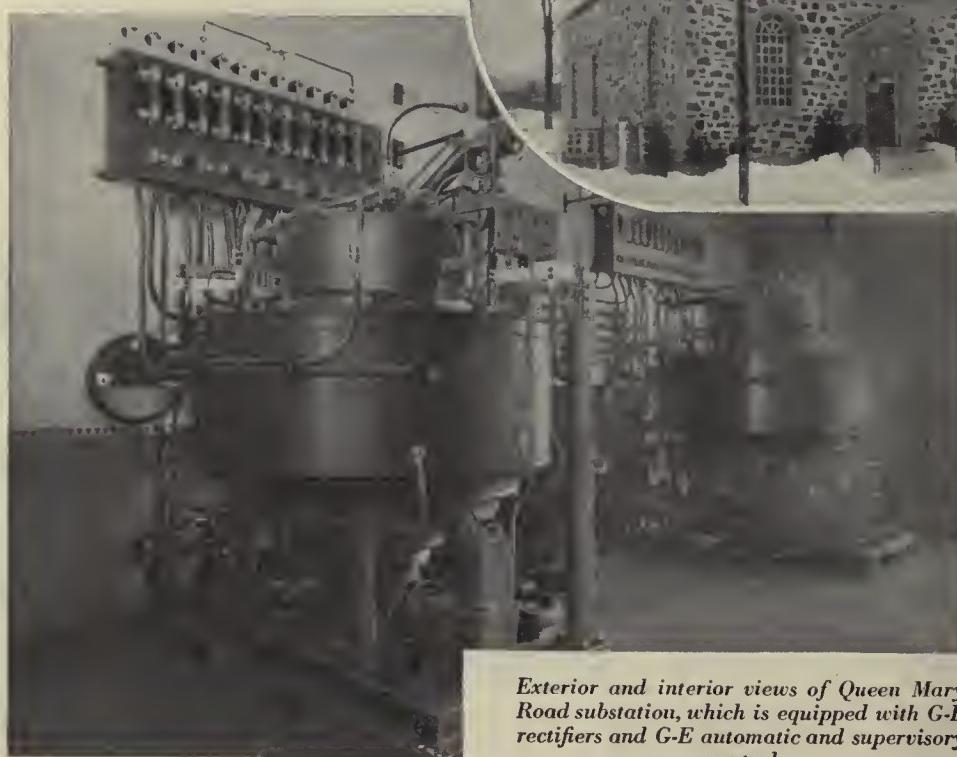
The Essco Catalogs are full of cost-reducing, maintenance reducing Specialties for Cars, Buses and Trolley-Buses. Consult it.

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**RAILWAY, POWER AND INDUSTRIAL
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QUEEN MARY ROAD SUBSTATION



Exterior and interior views of Queen Mary Road substation, which is equipped with G-E rectifiers and G-E automatic and supervisory control

G-E Rectifiers with Automatic and Supervisory Control Meet Every Need of This Substation

The proved performance of two 1500-kw., 600-volt G-E mercury-arc rectifiers placed in service nearly two years ago at Viau Substation by the Montreal Tramways Company led to the installation of two similar units in this most modern substation on Queen Mary Road, Montreal, Canada.

Quietness of operation—especially desirable in residential districts—and ample overload capacity are outstanding features of this equipment. And the operating records of both substations show an availability of almost 100 per cent since operation began. Queen Mary Road substation is completely automatic and is equipped with supervisory control. All of these features contribute to its economy of operation. General Electric Company, Schenectady, N. Y.



GENERAL  ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

130-32

ELECTRIC RAILWAY JOURNAL

New York,
November, 1931

Consolidation of
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JOHN A. MILLER, Editor

Volume 75
Number 12

Company Sustained in St. Louis Wage Decision

WITH evidence at hand that the revenues of the St. Louis Public Service Company were insufficient to maintain it in a solvent condition despite the numerous operating economies effected recently, the board of wage arbitration in its decision of Oct. 8 rejected the contention of the union employees that wages should be continued at the 1928 level, and voted in favor of a 10 per cent reduction. The board ruled also that a differential of 7 cents in favor of the operators of one-man cars and buses is adequate.

Faced with a probable deficit of more than \$800,000 if wages remained unchanged until the expiration of the contract next May, the company asked its employees some months ago to accept a 10 per cent reduction in wages contingent upon the earnings of the company. The union resisted this proposal and threatened a strike, but later agreed to arbitration. In the arbitration proceedings, it was contended by the union that 69 cents per hour, the existing wage for two-man operation, was not sufficient for the employees to maintain a reasonable standard of living, that 7 cents per hour was not a sufficient differential for one-man operation, and that the financial condition of the company was not such as to justify the proposed reduction.

On its part, the company maintained that earnings were inadequate to meet the requirements for operation, taxes, interest on indebtedness and depreciation, and that the only alternatives to a reduction in wages were to increase the fare, reduce service or further reduce maintenance costs. An increase in fares was regarded as of very doubtful efficacy. It would pass the burden of maintaining the existing wage level of railway employees to others whose wages and incomes had already suffered a decline. To reduce service would result in a further decline of patronage, and to reduce maintenance would impair the reliability and safety of the service.

In considering the issue, the majority of the arbitrators discussed the affairs of the railway at length and concluded, despite the dissent of the union representative, that the reduction was no more drastic than was necessary to permit the company to continue operation and to meet its fixed obligations. That this reduction will cause

actual hardship to the employees seems unlikely, for the cost of living in St. Louis has fallen more than 10 per cent since the time when the 69-cent wage rate was established. Moreover, as the board points out in its report: "In a financial crisis, an employee fares better under a solvent employer than he is apt to do under a receiver." While the reduction in wages is regrettable, it appears to have been necessary to keep the property in operation by the company. "In so holding," the decision reads, "we recognize the company's claim that its fare boxes being its only source of revenue, diminished revenues are bound to sound its death knell unless relief is granted."



Objectives of Car Research Becoming Clearer

AS PROGRESS in car research continues under the auspices of the Electric Railway Presidents' Conference Committee, the scope and objectives of the undertaking are becoming better understood by the industry. An idea was prevalent at first that the aim of the committee was to revolutionize car design—to produce a vehicle utterly different from that which the industry is using at the present time. It is now realized that the principal objective is to evolve equipment designs which are an improvement on existing ones, rather than to wave a magic wand and create something entirely new.

Among the specific needs receiving intensive study are (1) faster and smoother acceleration and braking, (2) noise reduction, (3) improved appearance, and (4) reduced construction cost. Experiments have been under way in the field laboratory at Brooklyn for several months past for the purpose of finding out how these ends can be attained. The work has not yet progressed far enough to permit publication of the results of the tests, but their general nature is outlined in an article appearing elsewhere in this issue.

That this study and investigation of the whole subject of car design should have acted to some extent as a deterrent to the purchase of equipment now on the market is easily understandable. No one wants to buy something today if it is going to become obsolete tomorrow. The idea that revolutionary changes in design are in

prospect, however, is now seen to be an exaggeration. Important improvements may confidently be expected to result from this research, but they are not likely to be such as to necessitate the scrapping of the rolling stock of modern design that is now in operation.

It must be remembered also that research is a continuing process. Substantial progress has been made in car design during recent years. Efficient and economical equipment is available today at price levels much lower than they were some time ago. If a railway needs new cars now, the time to buy them is now. Whatever improvements may be developed by the committee's study, its findings will not be the final word in car design. Other improvements will follow as the need for them arises and ways are found to solve other problems. The management which waits for the final word before buying new cars, will still be operating its old cars when the last trumpet sounds.



Atlanta Makes Outstanding Record in Winning Maintenance Award

FOR its high standards of maintenance in all departments the Atlanta division of the Georgia Power Company was awarded the company trophy in the 1931 Maintenance Contest sponsored by ELECTRIC RAILWAY JOURNAL. In thus being adjudged the winner among 42 competitors, the company received well-merited recognition for its excellent work. Although they did not win the trophy, many of the other competing companies also deserve high praise for their excellent records.

In view of the present economic situation and the consequent decreases in riding, the Georgia Power Company has been faced with the problem of curtailing expenses sharply. Its success in reducing all maintenance costs is in large part attributable to the use of the budget system. Department heads, in making special efforts to keep within the budget, have in most instances saved considerable amounts from the budgeted figures.

While reducing its costs, the Georgia Power Company has steadily raised its standards of maintenance. The company has adopted a definite policy of deferring no maintenance and has insisted on work of an even higher quality than has been done in the past. Evidence of the effective observance of these principles is shown in the remarkable pull-in records for vehicles, the excellent condition of the roadway, and the small number of wire breaks.

Following the principle that it is more economical to prevent equipment pull-ins than to repair vehicles as they fail in service, the company has insisted on rigid inspections and thorough overhauls. All work in the shops, and in the roadway and overhead line departments, has been facilitated by the use of modern machines, tools and methods. To increase the interest of the employees in their work and to eliminate carelessness, the company has placed a definite responsibility on each

individual employee by tracing every failure of equipment to its source.

The special effort made during 1930 which resulted in winning the award furnishes an excellent example of what it is possible for a railway to do in improving its maintenance methods and facilities. It augurs well for the industry that an increasing interest in this important part of railway operation is being shown on properties all over the country.



Making Taxicab Operation Safer

PREVENTION of traffic accidents is a matter of such importance that it has attracted the attention of many groups interested in transportation. A recent contribution to the subject is the report drawn up by the Safety Committee of the National Association of Taxicab Owners in collaboration with the Policyholders' Bureau of the Metropolitan Life Insurance Company. While only 80,000 of the 26,500,000 motor vehicles registered in the United States are taxicabs, they run about 1 per cent of the total annual motor vehicle mileage. Practically all the operation is concentrated in cities where traffic congestion is greatest. In New York, for instance, the report states that 32 per cent of the vehicle mileage of the city is run by taxicabs, which constitute only 2.6 per cent of the registered vehicles. Hence they are a major factor in traffic, far exceeding their numerical importance. Statistics indicate that the taxicab driver is a safer driver than the average operator of a private automobile. Even so, the total number of accidents in which taxicabs are involved is very large.

The report recommends a number of ways of making taxicab operation safer. A standard system of recording and analyzing accident statistics was proposed for adoption throughout the industry. More careful selection and training of drivers were urged in order to eliminate incompetent and physically unfit men, and to raise the qualifications for employment. Educational activities, such as safety advertising, safety committees, group meetings, bonuses and contests were put forward as means of stimulating interest in safe driving. Studies of individual cases of accident-prone men were proposed in order that remedial steps may be taken rather than the discharge of the individual. It also was held important that only safely constructed and safely maintained vehicles be operated. Preference was expressed for cabs designed for the purpose rather than converted pleasure cars.

The program outlined is similar to that which local transportation has been following in connection with electric railway and bus operation. Adoption of these methods surely will make an improvement in the number and severity of taxicab accidents. Safety effort among taxicab operators organized along these lines furnishes another illustration of the essential similarity of the problems of all forms of community transportation.

A Pioneer Passes On

THOMAS A. EDISON is dead. With his passing there has gone another of that group of pioneers whose work was instrumental in the development of our present mechanized civilization. Edison's popular fame is connected largely with the invention of the electric light. But it must not be forgotten that he played a prominent part in the development of the electric railway. His efforts, begun in 1879 and lasting through the next decade, had a marked influence on the progress of the art. Motors, generators and locomotives designed and built by Edison and his collaborators were among the first in this country. It was only when others had come to take over a large part of the development that he turned his effort to different fields. Thus the electric railway industry has always felt particularly close to this man who did so much toward the development of electricity. While we mourn, we see his spirit living on in the work he has done for mankind.



Misplaced Emphasis in City Planning

CIVIC beautification rightfully receives a substantial share of the attention of city planners. No one can deny that there is much room for improvement in the appearance of the average American city. Every reasonable effort in this direction deserves whole-hearted support. But, when all is said and done, beautification is only the icing on the cake, and should not engage the cook's attention to the neglect of the preparation of the ingredients essential to the cake itself.

Unfortunately, many city planners are inclined to make the mistake of concentration on esthetic problems while certain practical problems of vital importance in civic development receive scant consideration. Take, for example, a bulletin recently issued by the School of City Planning of a large Eastern university, listing a total of 24 courses of study. Two important courses deal with horticulture and plants. Their purpose, according to the bulletin, is to give the student information on soil, fertilizers, the most common and troublesome plant diseases, and to instruct him in the best methods of gardening public and semi-public areas. Another course embraces the history of Mediæval, Renaissance and modern art. But there is no course dealing with the problems of public transportation. Nowhere is any consideration given to the relationship between transportation facilities and civic development. It is true that one course contemplates the design of an ideal town, including the layout of a transportation system. This layout is merely incidental, however, the principal emphasis being placed on other features of the problem. No previous instruction having been given on the subject of transportation, the student apparently is expected to sketch in a few routes at random and call the result a community transit system.

Indifference to the transportation problem is partic-

ularly to be deplored at this time because the progress made toward its solution has been relatively less than in many other lines of civic development. Moreover, it is a problem that cannot be solved by the transportation men alone. Co-operation of all elements is needed. The comparatively minor problems of landscape gardening should not be allowed to obscure a subject of vital importance to the welfare of the entire community.



Electrification Should Proceed on Its Merits

INAUGURATION of construction projects involving immense expenditures has been proposed again and again as a means of relieving unemployment and stimulating business recovery. One of the favorite suggestions of those desiring to create jobs for the unemployed is to electrify all or a large part of the steam railroads. This is urged, not from the standpoint of the intrinsic merits of electrification, but simply as a means of putting men to work. Real friends of railroad electrification can only look askance at projects of this kind put forward without consideration of the economic side of the question.

A recent suggestion for the electrification of 50,000 miles of main line railroad is a case in point. This is roughly equivalent to 100,000 miles of track, or close to half the active mileage in the country. It is estimated that the cost would be upward of \$3,000,000,000. Even if this could be obtained in the form of a low-interest loan from the Government as proposed, the carrying charges would be staggering. No economic justification exists for undertaking such a project. Past experience shows that the greatest advantage of electrification is in the increase of capacity of crowded lines. There it can and does remove the limits imposed by the steam locomotive, and permits more intensive use of the existing plant. But with reduced traffic density all over the country, the need for greater capacity is not pressing. From the standpoint of operating cost the straight substitution of electricity for steam does not now show as much saving as it once did. Radical improvements have been made in steam locomotives with consequently reduced coal consumption and decreased maintenance costs. Today there are relatively few instances where a direct profit can be calculated on a straight substitution of electric in place of steam operation.

With labor and materials at the lowest prices in a generation, however, there are undoubtedly special locations where electrification would be advantageous. When it is considered that only some 4,500 miles of railroad track have been electrified in the United States, it is easy to see that there are numerous opportunities for its extension on a reasonable basis. But that is a far cry from any plan to electrify lines wholesale. To make such a move would be the height of folly. If real progress is to be made, electrification must proceed on its own economic merits.

Transportation—

A Fundamental of

By
MARK LEVY

President
Chicago Real Estate Board

MASS TRANSPORTATION and real estate are two inseparable phases of a city's being which have outgrown the corporate boundaries of the city itself. From an economic, commercial and residential viewpoint, cities have become metropolitan districts, the areas of which are now more accurately defined by the limits of convenient transportation. Although a certain amount of decentralization has been effected and is still a definite trend, the accessibility to the central business district of a city continues to be a major factor in the establishment or maintenance of land values.

In nearly every large American city, the history of community development is the history of transportation. Natural facilities for communication and travel governed the selection of the original sites for commerce and industry with residences grouped immediately around these districts. Then came the railroads, local transportation systems, and the resultant expansion of urban areas with increased values. Industry spread out along lines of communication, and residential communities moved farther away from the original center. But in nearly every instance, the great general commercial center of the city has remained fixed.

Chicago is a typical example of such expansion. This city naturally grew up near the mouth of the Chicago River and along the branches of the river. It was incorporated as a town in 1834 and as a city in 1837, with a population of 3,297 and a land area of 2.41 square miles. From 1850 to 1860 a new, factor affecting the form and character of the city's growth appeared with the building of steam railroads to the port. During this decade ten steam railroads, three from the east and seven radiating toward the west, northwest and southwest, entered the city and located their freight and passenger stations as close as possible to the wharves and general shipping points along the river.

From this time onward, the city not only took on a new importance as a railroad center, but it also underwent a marked change in its territorial development, both the residential and business sections showing a tendency to follow the steam railroad lines away from the original water shipping centers. The influence of the steam railroad and lake traffic has continued to affect the city's growth, both having the common characteristics

Land Values

Accessibility is the keynote. Time has become a greater factor than distance. More arterial rapid transit lines with co-ordinated feeder service will maintain land values over broader areas and insure the stability of the transportation business

of concentrating freight and passenger delivery in what is now the heart of Chicago, the central business district—the Loop.

As a result of the condition just mentioned, Chicago has developed radially from this center. Stores, commercial houses and factories, originally concentrated here, have lately become somewhat more widely distributed, but the commercial center of the city has remained fixed. However, the growth of the central business district, including the surrounding factory zone, has tended to spread the residential district constantly outward from this center. The construction of surface and elevated lines, which have constantly reached out into new territory, as well as the major railroad improvements, such as that made by the Illinois Central Railroad, and the services of the three interurban electric lines originating in Chicago, have definitely stimulated this outward movement of population.

Despite the constant improvement in transportation, the daily rush-hour traffic, converging from the residential districts to this common center, has become more and more difficult to handle. In comparatively recent years business subcenters have grown up in outlying districts and have assumed real importance. The history of Chicago indicates that the present concentration in its central business district has been the result of a long period of development, which now appears to have reached the stage of transition where well-considered changes for co-ordination in the transportation systems will undoubtedly effect a very desirable distribution and readjustment of the residential and occupational districts.

Decentralization has been the major trend in all city development for the past several decades, and is still a major factor in the expansion, not only of transportation

and real estate activities, but of stores, theater enterprises, etc. Chain stores have had and are having an important effect upon business development, both in the central business districts and in outlying centers. Their location may be taken as something of a measure of land values and consequently of the effects of transportation service, since chain stores have of necessity adopted the general policy of locating only in the most convenient and accessible locations.

Many factors enter into the success or failure of outlying business centers. One important factor is the distance of the subcenter from the city's central business district; another, the factor of time in transportation to the central districts. From the standpoint of distance, points at which business has successfully developed in subcenters have been gradually extended. Distances of 8, 10 or 12 miles from the city's center seem to be appropriate now in the case of cities the size of Chicago. If the areas are closer to the central business district, they come into too much competition with downtown agencies. There is also a decided limit as to how far people are willing to live outside of the central part of the city, and that limit is not one of miles but of time. In the writer's opinion, the limit is that area not exceeding 45 minutes travel to the central business district.

Again, outlying business sections develop only with the development of the surrounding district as a residential section and trade area. As a matter of fact, subcenter business depends not only upon the immediate residential district but also areas lying far beyond what might be termed the subcenter development itself. An excellent example of a successful metropolitan subcenter is found in the city of Evanston, just north of Chicago. The city itself has a population of 67,000, but the trade population of the Evanston merchants is 250,000 people. The city draws from a trading area of 194 square miles. Evanston is a successful subcenter because of this outlying trade area and in spite of its accessibility to central Chicago by means of steam railroads, rapid transit lines, surface lines and motor buses.

Another type of subcenter development, with different results, is that similar to the areas surrounding 63rd Street and Cottage Grove Avenue on the south side, or Wilson Avenue and Broadway on the north side of Chicago itself. These developments are too close to the downtown district of Chicago and transportation is too good. Although a certain amount of commercial activity is centered there, the communities are not first-rate subcenters with the larger type of business institutions. The people living in these areas are of the "white collar" class who work in the offices of the central district, and who naturally do a large amount of purchasing downtown.

Many other examples showing the relationship between transportation and land values, whether for commercial or residential development, could be quoted. Two of these—in Philadelphia and New York—are illustrative. In Philadelphia, the construction and operation of the Market Street elevated and subway system not only made possible the exceptional subcenter at 69th and Market Streets and a large residential area surrounding that point, but increased land values through West Philadelphia to that point and maintained land values in the heart of downtown Philadelphia which were on the verge of collapse. In New York City, it is reported that the total value of land, assessed at a few million dollars prior to the development of the subway systems, increased subsequently to several billions.



MR. LEVY, president of the Chicago Real Estate Board, has been engaged in the general real estate business in Chicago for more than a quarter of a century. His activities have included selling, leasing, loaning, managing, chain store reiting, developing and appraising of real estate investments, as well as acting in an advisory capacity for the acquirement of various classes of property. His qualification to discuss the relationship between transportation and land values is scarcely equaled in this country today. In 1916 Mr. Levy appraised the land of the Chicago Elevated Railroad for the Chicago Traction and Subway Commission. In 1919 he appraised all of the land previously valued and additional properties for the then Chicago Elevated Railway. In 1928 and 1929 he appraised the property of the Chicago Rapid Transit Company in Chicago and Cook County, Illinois, comprising the Elevated Railroad System, and also valued part of the rights-of-way of the Chicago Junction Railroad, New York Central Lines, the Chicago, Aurora & Elgin Railroad and the Chicago, Milwaukee & St. Paul Railroad. Mr. Levy represented the city of Chicago through the Board of Local Improvements on several street widening and public improvement cases, in an advisory and expert capacity. In 1923 and 1924 he represented the Board of Local Improvements of the city of Chicago in the \$22,000,000 South Water Street improvement case in an advisory and expert capacity, embracing the valuation of all lands in the South Water Street assessed district in an amount in excess of \$1,000,000,000. Mr. Levy is a past-president of the Cook County Real Estate Board, and is the treasurer-elect of the National Association of Real Estate Boards.

After all, land is valuable only to the extent to which it can be used and is accessible. Real estate operators study transportation and its trends as the most important factor of values, and to aid them in forecasting future activities. Land values in which realtors and real

estate owners are interested depend in a large measure on the character of service which transportation agencies provide or will provide for the public. Good transportation and good service influence a purchaser. There is no limit to the increase in land values which good transportation service brings.

The effect of transportation on land values and on the growth and progress of industrial centers is greater than it is on residential land. How the factor of transportation enters into land values of all types can readily be seen by picking up any Sunday newspaper and glancing over the advertisements of the realtors. Transportation is always emphasized.

As has been stated, the history of city growth is closely aligned with the history of transportation. But what of the future? In the writer's opinion, transportation must keep one step ahead of city development. It must remain the backbone on which natural expansion depends. Metropolitan districts are surely becoming better places in which to live and carry on the pursuits of life and happiness. Trade areas are broadening; residential sections are being improved, whether they be districts for homes

or apartment houses; commercial activities, while retaining their central district advantages, are taking their products and services to the people by establishing outlying branches; census returns are showing a larger growth in suburban areas than in the central regions.

Transportation must be modernized along with all the other factors of city development. With the trend of decentralization in mind, transportation agencies must recognize that a psychological element as well as a practical necessity enters into the desire of people to be within easy access of the downtown area. People want to come downtown occasionally, and above all they want to feel that they can do so quickly and comfortably. More rapid transit is unquestionably the solution. More rapid transit plus a well co-ordinated feeder service with modernized equipment and operating conditions, which will move people about a city with the least possible trouble to themselves, will not only be profitable to the transportation system but will directly benefit the land-owner. The efforts for security of the two factors will be one. Transportation and real estate will continue to be inseparable partners in community development.

Auto-transformers Feed Reading Electrified System

By A. I. TOTTEN

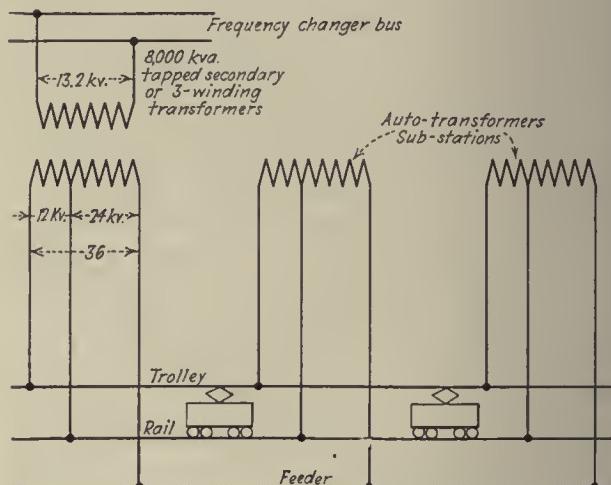
*Transportation Engineering Department
General Electric Company*

WHEN the Reading Company laid out the power distribution for its Philadelphia suburban zone electrification, because of the somewhat limited range it was decided to adopt a three-wire distribution system fed from a single point, Wayne Junction, where frequency-changer sets would be installed by the Philadelphia Electric Company for converting from three-phase, 60-cycle current to single-phase, 25-cycle current for railway use. This arrangement permitted the adoption of balancing or auto-transformers instead of two-winding transformers at the outlying distribution points, spaced 5 to 7 miles apart. Besides the lower investment and possibly higher distribution-system efficiency, there also is the possibility of balancing currents which will, in greater or less degree, minimize inductive effects.

Before determining the capacity of the individual windings and the aggregate rating of each unit, an elaborate study of the system was made to ascertain the proper relation of reactances to give the desired current distribution under normal and short-circuit conditions.

The three single-phase, 25-cycle transformers as finally specified and built by the General Electric Company are rated 8,000 kva. at 13,200 volts on the primary. The feeder-to-rail secondary is rated 3,333 kva. at 24,000 volts, and the trolley-to-rail secondary is rated 5,333 kva. at 12,000 volts. These are normal continuous ratings with 40 deg. C. temperature rise. Following this load, the transformers will carry 150 per cent load for two hours with not over 60 deg. rise, after which 300 per cent load can be carried for five minutes with not more than 75 deg. rise.

The specified reactance values on an 8,000-kva. base were: Primary to feeder-rail winding, 8.6 per cent; primary to trolley-rail winding, 6 per cent; primary to trolley-feeder winding, 4.6 per cent, and trolley-rail to feeder-rail winding, 14 per cent.



Method of connecting Reading transformers to frequency changer bus and distribution system

Because high insulation values were needed for the trolley and feeder system, primarily because of smoke and dirt incident to steam locomotives, it was likewise deemed essential to provide superior transformer bushing insulation. The specifications required the following dry and wet arc-over values for the bushings: Primary terminals and trolley terminal, 150 kv. dry, 110 kv. wet; feeder terminal, 195 kv. dry, 155 kv. wet; rail terminal, 70 kv. dry, 45 kv. wet.

The transformers as supplied are fully self-protective under any practical condition of short circuit, without considering the external reactance of any part of the system. Special incorporated and auxiliary features include ratio adjusters, flanged wheels, Bristol indicating thermometer and mercoid temperature controller.

HIGHER MAINTENANCE STANDARDS *and LOWER COSTS*



Reliability of service, an important factor in winning the favor of patrons in Atlanta, is made possible by the high maintenance standards



Plaque awarded to the Georgia Power Company, Atlanta division, winner of Electric Railway Journal Maintenance Contest

PROFICIENCY shown in all branches of maintenance work by the Georgia Power Company, Atlanta division, resulted in the award of the 1931 ELECTRIC RAILWAY JOURNAL Maintenance Contest to that company. With the purpose of broadening the scope of the contest this year, the plan was adopted of basing the company award upon data showing the general character, quality and cost of the maintenance work done by the various contestants during that calendar year 1930. A total of 42 companies submitted their records in the competition. Presentation of the prize, a handsome silver plaque, was made at the general session of the Engineering Association at the recent Atlantic City convention, by W. W. Wysor, chairman of the committee.

In winning this award, the Georgia company made an enviable record. Although its standards of maintenance have been raised and the cost lowered over a number of years, an even greater effort was made in 1930 to achieve better results. This effort is reflected in decreased unit costs of car, bus, track and overhead line maintenance. The average car mileage and bus mileage per pull-in have been con-

siderably increased, and trolley wire breaks greatly reduced. Regular inspections, painting and general cleaning were carried out on the usual schedules, and a substantial proportion of the entire rolling stock was completely overhauled. Track maintenance was held to a high standard in the face of a decreased budget, and a substantial mileage was thoroughly reconditioned during the year.

Other important maintenance activities of the company include frequent grinding of wheels to eliminate thin flanges and flats, salvaging worn parts by welding and other methods, rebuilding buses to make them more serviceable, conversion of equipment for one-man operation, keeping accurate records of all phases of work, decreasing the inventory of stocks by more careful planning, installing new machinery to effect savings in overhaul and repair work, reducing lost-time accidents among all shop, garage, roadway and line employees, and fostering a spirit of co-operation among the employees in all departments.

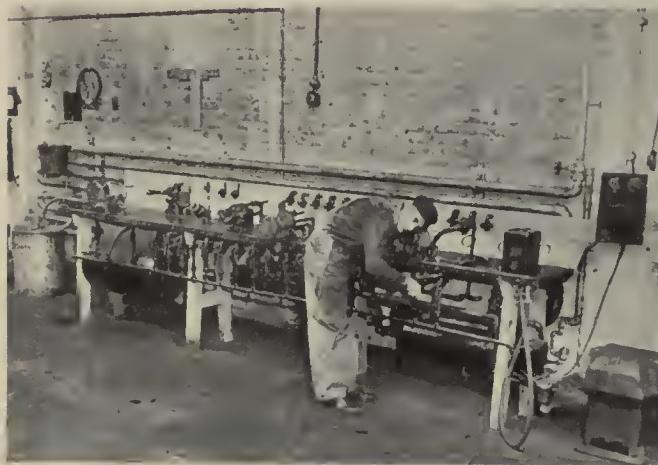
While endeavoring in every way to reduce expenses, the management has adopted the policy that absolutely no maintenance shall be deferred. That this policy was followed rigidly is indicated by better pull-in records for cars and buses, and by the present excellent condition of all track and overhead. By thus keeping its physical plant in first-class condition, the company has been able to render high-grade service to its patrons.

For outstanding accomplishments in all departments, the Georgia Power Company won the *Electric Railway Journal* Maintenance Contest Award in competition with 41 other electric railways

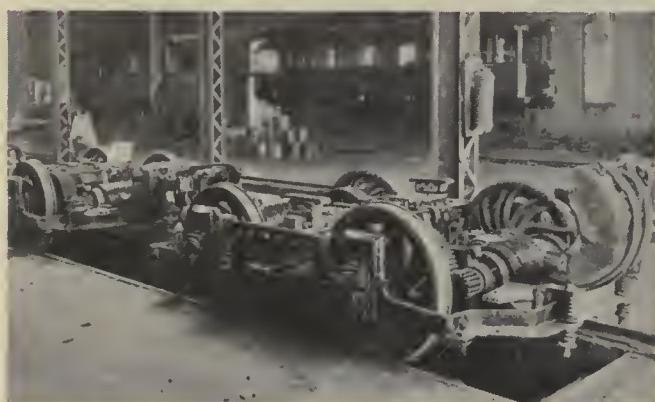
Use of the budget system for all departments has aided the management in trimming its expenses. In September and October of each year an estimate of revenue and expenses for every month of the coming year is prepared. In making this estimate, the company carefully apportions the operating expenses, taking into consideration all factors such



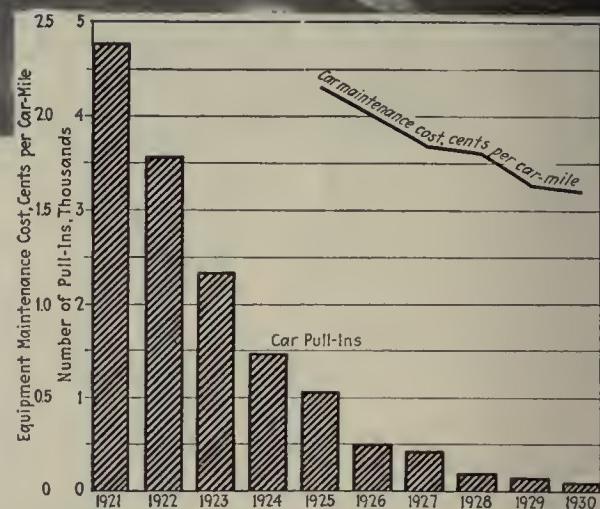
Car overhauling is facilitated at the Fulton County plant by using modern machinery



All types of air equipment are tested on this specially constructed bench before being placed back on the cars



Trucks being reassembled after thorough overhauling



While pull-ins have been reduced from 4,765 in 1921 to 90 in 1930, the cost per car-mile for maintenance has been steadily decreased

as number of cars and buses to be overhauled, amount of track that must be reconditioned and the possible saving in operating expenses through an increase in one-man service. As each month approaches, the figures are subject to revision, depending upon the trend revealed in the more recent months. If a downward revision is necessary, the cut is distributed over all departments. Not only do the departments endeavor to keep within the budget, but all try to go under the budgeted figure as far as possible. During 1930, the actual operating expenses were considerably under the budget. From this it will be seen that the use of the budget has been a great aid in lowering maintenance and other expenses.

Co-operation among all divisions of the company is another factor which has contributed to its excellent maintenance record. The need for paying more attention to details and co-ordinating the efforts of all groups has led to a better understanding on the part of every employee of the responsibility of the other. The proper operation of the cars by the trainmen, the reduction of flat wheels, accidents and collisions, and the saving in power have all been of material aid in reducing maintenance costs. In promoting this attitude, the management itself has co-operated in every way possible.

In the following pages the particular accomplishments of the rolling stock and shops, way and structures, overhead lines, and bus departments will be outlined. Each has contributed its part in winning the award, and each has a record of numerous new methods, devices, and general improvements adopted.

Equipment Department Has Notable Record of Accomplishment

OUTSTANDING records have been made by the Georgia Power Company during the past several years in the maintenance of equipment. The purchase of new cars, the rehabilitation of older cars, the exchange of records with other railways, the rigid inspection and the frequent overhaul have been largely responsible for the good accomplishments.

Reductions in maintenance cost have been accompanied by substantial decreases in car failures. Pull-ins have been reduced from an average of thirteen per day in 1921 to one every four days in 1930. The cost of maintenance of equipment and the number of miles operated per pull-in since 1925 are shown in the tabulation below:

Comparison of Maintenance Costs and Performance

Year	Total Equipment Maintenance Cost	Equipment Maintenance Cost per Car-Mile, Cents	Miles per Pull-In
1925.....	\$285,486.04	2.17	12,226
1926.....	265,379.14	2.00	26,041
1927.....	248,583.02	1.85	29,685
1928.....	235,236.01	1.79	77,664
1929.....	212,528.02	1.62	83,861
1930.....	205,280.70	1.60	142,877

The best evidence of the high standards set in overhauling and repairing the cars is found in the record of pull-ins. Using the Southern Equipment Men's Association definition of a pull-in as "a car which has to be removed from service prior to completion of its regular prescribed run for any mechanical, electrical or man failure, or accident will be termed a pull-in," the company has kept a record of all failures for a long period of years. The following table shows the total for the years 1921-1930, and the average per month and per day.

Ten-Year Record of Pull-ins

Year *	Total for Year	Average per Month	Average per Day	Average Miles per Pull-In
1921.....	4,765	397	13.2	3,002
1922.....	3,577	298	9.9	3,820
1923.....	2,342	195	6.5	5,859
1924.....	1,479	123	4.04	9,341
1925.....	1,070	89	2.95	12,226
1926.....	508	42	1.39	26,041
1927.....	458	38	1.22	29,685
1928.....	169	14	0.463	77,664
1929.....	156	13	0.42	83,861
1930.....	90	7.5	0.24	142,678

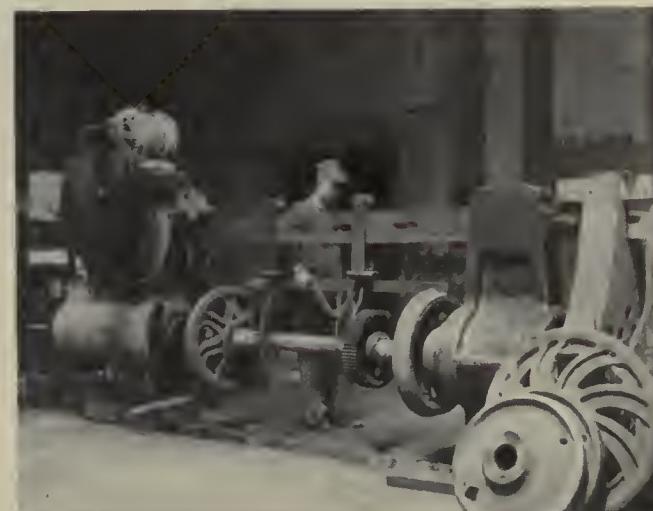
Of the 90 pull-ins during 1930, 42 were not chargeable to the mechanical department. The remaining 48 "chargeable" pull-ins are equivalent to an average of 0.13 pull-ins per day, or 267,521 miles per pull-in. For the year 1929 Atlanta topped the list of the member companies of the Electric Railway Association of Equipment Men, Southern Properties, with an average of 83,861 miles per pull-in. In 1930 the company held second place in the rating.

Comparative maintenance costs of 26 cities in the Southern Equipment Men's Association show that during the year 1930 Atlanta was next to the lowest. Costs for these cities ranged from 15.2 to 32.89 cents per car-mile, and averaged 21.18, Atlanta's figure being 16.21 cents, or 4.97 cents below the average.



Door engines are removed from the car at the time of overhaul and dismantled for checking

Since the report of the Georgia Power Company for the competition included the rail operations of the city lines in Atlanta, the Stone Mountain interurban line and the Atlanta Northern Railway line to Marietta and Smyrna, the records are for the maintenance of 356



Wheels are ground in a lathe during the regular overhaul



Wheels that show signs of wear on the flanges are ground while under the car

active cars. This number includes 326 city motor cars, nine city trailers, fifteen interurban motor cars and six interurban trailers. All of these cars are double-truck, and most of them are equipped for one-man operation. All major repairs, overhauling and painting are taken care of at the so-called Fulton County plant. The cars are operated from three carhouses, known as Butler, Edgewood and Ashby.

During the year 1930 a total of 192 cars, or 54 per cent of all active cars on the system were overhauled.

How the savings in maintenance expense were distributed is shown in the following table, listing the amounts for each account for the years 1928, 1929 and 1930. From this it will be seen that the principal reduction has been made in the car account.

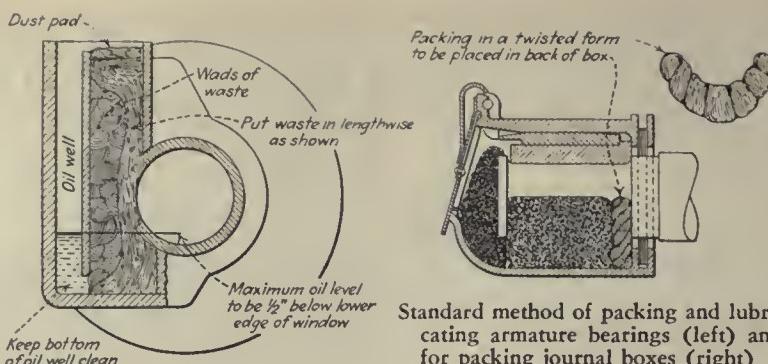
Distribution of Maintenance Expense

Account Number	Maintenance Account	1928	1929	1930
329	Superintendence.....	\$8,866.01	\$14,570.99	\$13,689.62
332	Car.....	140,884.83	119,979.62	115,717.48
333	Electrical equipment of cars.....	62,256.68	57,168.28	64,056.73
337-1	Shop expense.....	22,530.29	21,293.56	21,160.65
337-2	Shop equipment.....	656.80	458.94	611.30
339.1	Miscellaneous equipment.....	41.40	56.63	44.92
	Total.....	\$235,236.01	\$212,528.02	\$205,280.70
370	Carhouse expense.....	\$135,196.56	\$126,743.43	\$116,032.72

The decrease in maintenance costs has been accompanied by an increase in average wages, from 66 cents per hour in 1926 to 72 cents in 1930 for overhaul shop employees (white), and from 56 cents to 65 cents over the same period for carhouse attendants. More efficient operation of the shops, with newer cars, improved methods and labor-saving shop equipment, have enabled the company to reduce its mechanical department force from 216 to 154 in the last four years. Thus, even while wages were increased, the total payroll showed a decrease from \$305,966.43 in 1927 to \$239,471.93 in 1930.

During the entire year of 1930 there were only two lost-time accidents in the entire mechanical department. One of these was caused by negligence on the part of the affected employee. This record compares with nineteen lost-time accidents in 1926 and fifteen in 1927.

Aside from the work of overhauling, inspecting, repainting and cleaning, the mechanical division did a number of special jobs which were not part of the regular routine. Of these, the most important was equipping 85 cars with steel wheels. In March, 1930, the company began by equipping 50 one-man city cars, removing the cast-iron wheels. That work was completed in September



Standard method of packing and lubricating armature bearings (left) and for packing journal boxes (right)

derailments, caused by broken flanges.

During the year the mechanical department also installed grab handles on 50 cars, changed register stanchions in 90 cars, changed foot rests on 75 cars, installed a metal shelf for the operator in 50 cars, changed ventilation on 50 cars, changed drawhead couplings on twelve cars and moved the gong valve to the inside of 40 cars. The department also rebuilt one flat car, installed a new floor and sheet-iron covering on another work car, made sign changes necessitated by route changes between the three carhouses, and replaced 30 old compressors with a new type.

A record of work done at the Fulton County plant in 1930 shows that 190 cars were overhauled and 810 were repaired in the truck and motor shop, of which 206 were gone over in the carpenter shop and 185 were painted.

The mechanical department made a number of improvements in its shop equipment during 1930. Among these were the installation of an electric hoist in the truck shop; use of separate wires to electric welders, saving time and causing less welder troubles; installation of a bench for testing all air devices, this being so equipped that all parts get a service test before being put back on the cars; improvement of the test rack for checking door-engine magnet valve coils, a device which has proved valuable in reducing valve troubles; installation of a test bracket for checking PC control valves and re-

lays; improvement of the field tester, enabling electricians to find defective fields that previously were not being detected; change of the armature ground tester, useful for finding defective armatures before going into service; improvement of an air gage tester, making it possible to set all gages the same; and adoption of a better method of banding armatures, which reduces open circuited armatures. Carhouse equipment installed included a machinist vise, a hydraulic jack, a 10-ton hydraulic hand pump and hoist, and a rack for trolley poles.

In car overhaul work a definite procedure, accompanied by special tests and methods, is followed. Much of the success in reducing pull-ins is due to the thoroughness of this overhaul. All parts, though some may appear to be in good condition, are checked carefully before being reinstalled on the car. If any equipment shows wear or proves



Cars are kept attractive by painting them every 22 months

defective under test, it is repaired, rebuilt or replaced. The rigid policy is that all equipment must be in condition to operate satisfactorily until the next overhaul. Mileage records are kept for each car; and at the end of every month the mileage is checked. As soon as a car approaches the 80,000-mile mark, it is withdrawn for overhaul.

When the car enters the shop, the body is raised and the trucks moved ahead on the track. All equipment, including the air compressors, door engines and controllers, is removed from the car and the body repaired. The trucks are completely dismantled, the motors going to the electrical shop and the brake rigging, wheels and bearings to other sections of the shop. When all parts have been brought up to standard, they are again assembled. The car then proceeds to the paint shop, if it is in need of painting, or to its regular carhouse.

In the motor repair shop the armatures are removed, checked, and rewound, banded, dipped and baked. Particular attention is given in this shop to inspecting armature bandings, as it is thought that the life of the armature depends to a great extent on how well it is banded. Armatures are tapped lightly with a hammer, and if any vibration is noted the bands are removed. Other electrical devices, including the line breakers, lightning arresters and energy consumption meters are thoroughly tested and overhauled. A special installation of meters and necessary auxiliary equipment permits the testing of all electrical equipment on the car. In overhauling the watt-hour meters, double-distilled mercury is used. This mercury is clean enough to last until the next regular overhaul and gives an increased life to the meters.

Compressors and door engines are taken to the air department, where new gaskets are substituted and worn parts replaced. A bench has been constructed in the shop which permits testing of all air devices used on a car. Worn air compressor cylinders are rebushed on a special machine designed for this purpose. This same machine is used also for axle bearing fits on motors. In going over the operators' equipment, the brake valves are completely dismantled, inspected and reassembled.

Whenever necessary, brakeshoe heads are built up by electric welding. Bolster guides also are built up by welding, and then turned down to shape with a special lathe tool in a radial drill. The original bushing is then put on the guide and welded. The same procedure is followed for brake hangers, or other apparatus using a half-ball bearing. Pins, hangers and other parts of the brake rigging are renewed.

Regular inspections of the cars are made at the three carhouses on a 1,400-mile basis. This inspection is very comprehensive, including trucks, motor leads, brushes, brakes, controllers, line breakers, compressors and other parts. The accompanying repair work consists primarily of replacing, lubricating and adjusting worn parts.

An important part of all work in the mechanical department, particularly that of the inspectors and those in charge of overhaul, is the personal responsibility involved. Any troubles that result are traced to the inspector who failed to report properly or to the mechanic who repaired the defective part. This system has aided greatly in obtaining a thorough reconditioning of the equipment.

Much attention has been given to the lubrication of wearing parts. The company has adopted a set of standard practices which are followed rigidly. In the pro-

cedure for packing armature and axle bearings, the packing next to the shaft or axle is made in the form of a wick. The wicks for bearings are made into skeins long enough to reach from the bottom of the waste chamber up to about 6 in. above the seat of the chamber cover. The skein is then twisted about one complete turn in order to hold all of the strands in place, and to produce a more springy wick. After the wick is formed in the chamber it is pressed against the shaft with a packing iron and then the necessary additional waste is forced behind it. A little oil is added when packing, if the waste is not sufficiently saturated. The loose upper end of the wick is then folded over the other waste and tamped down tightly. Care is taken that enough waste is placed back of the wick so that the loose end is above the opening of the bearings after being tamped. A pad of saturated waste large enough to fill the remainder of the chamber is then placed on top of the wick to catch and hold dirt which might fall in when the bearing housing cover is open. Armature and axle bearings are repacked every six months on all cars. Waste is teased every three months on the improved type housings, and every 30 days on all other cars.

Armature and axle bearings are oiled every 1,400 miles, at the time of the regular inspection. Oil is put in the well and not on the waste. If the waste is found to be dry and not feeding properly, all the waste is pulled out and observations made as to whether the opening between the waste chamber and the oil well at the bottom is free from dirt. Oil in the loose well is measured with a rod marked for the different oil heights, and checked with a table of depths specified for the various types of motors.

Truck journals are repacked every six months, in the spring and fall. The first waste inserted is in the form of a roll, and is packed tightly in the rear end of the box. Sufficient waste is then added and packed firmly enough to form a good wiping contact with the journal. Waste placed at the side of the journal is never above the journal center and lies rather loosely. The dust pad is then replaced, all surplus oil and waste threads are removed from the mouth and edges of the box and the lid is closed tightly. Center and side bearings are oiled with a bearing grease every three months.

For gears and pinions it has been found that the best results are obtained by frequent addition of small quantities of grease. About $\frac{1}{2}$ lb. of grease is applied at each inspection period, and spread on the gears and pinions as far as the hand can reach through the handhole plate. Air compressors are examined on inspection days, and enough oil added to bring the level within $\frac{1}{4}$ in. of the top of the filling plug.

Special attention has been given in Atlanta to the grinding of wheels. By grinding whenever necessary and making certain that the two wheels on a single axle are of precisely the same diameter, the company has greatly increased the life of wheels, has eliminated thin flanges, and has improved the smoothness of operation. Cars are inspected frequently, and, if a thin flange on a wheel is discovered, the car is immediately sent to the Butler carhouse where the grinding equipment is installed. The wheels are not taken off, but the car is raised slightly so that they can turn freely. A motor-driven emery wheel is then placed in position under the car and the wheels ground to correct size. Through proper grinding, the life of steel wheels has been increased from 83,000 miles to about 145,000 miles.

Track Construction and Maintenance on Economical Basis

WHILE maintaining track at a high standard, the Georgia Power Company has greatly reduced the cost. This has been accomplished in part by developing efficient methods and economical types of track construction. Careful supervision; modern equipment, including a rail grinding car, a pneumatic sand car and a welding truck; good construction in the past and the application of up-to-date methods are other factors which have contributed to the company's excellent record.

A clear picture of what the roadway department has accomplished in reducing costs may be obtained from the following table:

Track Maintenance Costs, 1923-1930

Year	Cost of Maintenance	Per Cent of Revenue	Cost per Track-Mile	Cost per Car-Hour	Cost per Car-Mile
1923	\$223,776	4.27	\$1029	\$0.1492	\$0.0163
1924	214,491	4.25	982	0.1473	0.0156
1925	176,541	3.44	803	0.1311	0.0135
1926	174,600	3.32	794	0.1290	0.0132
1927	176,477	3.44	784	0.1280	0.0131
1928	149,130	2.78	661	0.1089	0.0114
1929	148,194	2.83	659	0.1100	0.0113
1930	136,216	2.85	606	0.1040	0.0106

"Cost of Maintenance" for this table includes accounts 1 to 11, inclusive.

and 80-lb. rail. Formerly rail traffic was held off of this type of track for 21 days after concrete was poured. By using calcium chloride the time was reduced to seven days. At present, an International concrete pulsator is used which permits the track to be built while in service. Variations from this type of construction include the use of a 1-in. layer of asphalt for the paving surface in place of all concrete, the use of International steel twin ties, either with a concrete or asphalt surface, and the use of Dayton mechanical ties. Two other types used are the 122-lb. rail beam construction and the solid tie, ballasted and grouted. Thermit joints are standard for all new track and track being rebuilt. When wood ties are used, spikes are driven without boring holes in the ties.

In recent years a total of 49.14 miles of track has been built, five major types of construction being used. A tabulation of these types follows:

Recent Track Construction in Atlanta

Type of Construction	Miles
International steel twin tie.....	6.42
Dayton mechanical tie.....	0.80
Beam construction, 80-lb. A.S.C.E. rail.....	25.49
Beam construction, 7-in., 122-lb. rail.....	4.65
Solid tie construction, 7-in., 122-lb. rail.....	11.78

By solid tie construction is meant track built with the ties spaced approximately 2 ft.



International steel twin ties were installed when this double track was rebuilt



Through use of International concrete pulsator track now can be built under service

Much of the success in reducing the costs of the roadway department is due to the detailed budget, the careful checks of expenses and revenue each month and the efforts made to keep within the allowed amounts. For the past year \$180,000 was appropriated for roadway maintenance. The actual amount spent was \$162,328, a decrease of \$17,672, or 9.82 per cent under budget. It also represents a decrease of \$14,324, or 8.11 per cent, from 1929. In arriving at these figures, accounts 301 to 306, 308 to 312, 315 to 317, 322 and 324 are included.

In the record of unit costs of total maintenance, the cost per mile of active track decreased from \$596 in 1929 to \$553 in 1930, or 7.3 per cent. The cost per car-mile was lowered from \$0.0100 to \$0.0094, or 6 per cent, and the cost per car-hour declined from \$0.0970 to \$0.0925, or 4.64 per cent. These figures are based on charges to accounts 301 to 310, inclusive, 315 to 317, inclusive, 319 and 322.

At the close of 1930, the system included 229.176 miles of active track. This total is made up of 86.774 miles of double track and 55.628 miles of single track. Several types of track construction are used in Atlanta. The type considered the most economical and the one most used recently is the concrete beam construction, using wood ties

During the year, a short stretch of track of unusual type was built. Trough channels, joined by steel angle bars and embedded in concrete, were installed for holding the individual rails and the surrounding asphaltic concrete. The aim of this design was to obtain a track with rigid foundation suitable for asphalt pavement, allowing the use of a light section T-rail and permitting sufficient flexibility immediately around the rail to deaden noise and assist in preventing corrugation.

In constructing this track an excavation was made, 6 ft. 5 in. wide and 6 in. deep. This was rolled and then a longitudinal trench was excavated about 18 in. in width and 16 in. in depth for the troughs. Second-hand cross ties were laid across this excavation, 80-lb. A.S.C.E. rails were laid on them, the rails were shimmed up to suitable line and grade and thermit weld joints poured. The trough channels were placed under the rails and cross angle members and holding clips bolted to trough and base of rails. The temporary cross ties were removed and the track blocked and shimmed to proper line and grade. Before the track was lowered in place trenches were dug for the cross-channel members. Concrete was then poured to the top of the vertical leg of the channels while the track was being vibrated.

After the concrete had cured sufficiently, asphaltic concrete was tamped as hard as possible around the rail to the proper elevation. A concrete groove was then formed with Incor cement, which obtains a workable strength in 24 hours, after which a paving asphaltic surface was laid. On the vertical leg of the trough angle cuts were made in the top of the angle on the gage side about 1 in. apart and $\frac{1}{8}$ in. deep. Steel between these cuts was hammered over toward the rail to form an anchorage for the groove concrete. These anchorages were spaced approximately 1 ft. apart. This work was done in the shop and the cuts were made by an oxyacetylene flame.

Under heavy traffic conditions it is expected that the trough channels and foundation will outlast several sets of rails. It will be an easy matter to excavate the asphalt from around the rail, remove the nuts and clips and install new rail. No concrete comes in contact with the rail except the small amount used on the gage side to form a groove for wheel flanges. If the asphalt were brought up to proper level for groove it would soon become gouged out of surface by the action of flanges.

During 1930, a total of 9,881 miles of trackwork was done. This included 0.336 miles of new track built, 6,450 miles of track rebuilt, 2,941 miles of track resurfaced and 0.154 mile of track repaired by cutting in short pieces of rail. In the past year there were 158 active construction orders, the total estimated cost of which amounted to \$433,236. The actual cost of this work was \$399,610, a saving of \$33,625. New special work was installed at five locations, old special work was abandoned or replaced by new design at seven points, and old special work was replaced by new of the same layout at eighteen locations.

For the past several years, track activity has been maintained at an almost even pace. Extensions have not been numerous but track rebuilt has remained about the same. The following table gives the mileage of track built and rebuilt for the past seven years:

Summary of Trackwork, 1924-1930

Year	Built	Rebuilt	Total
1924	2,999	6,995	9,994
1925	3,106	6,670	9,776
1926	1,345	6,883	8,228
1927	3,308	6,266	9,574
1928	0,689	7,338	8,027
1929	1,127	6,036	7,163
1930	0,336	6,450	6,786

To insure smooth track throughout the system, all rail, including joints, is ground by a reciprocating grinder when installed and when any part of the track shows signs of corrugation. This work is done with a separate car equipped with a grinder and other necessary equipment. During the year 72.1 miles



Pneumatic paving breakers and other modern machines help the roadway department to lower costs

of old rail was ground for corrugation at a total cost of \$19,230, or \$0.05051 per foot. An average of 813 ft. of old rail was ground per nine-hour day. New rail ground during the year totaled 16.95 miles. This was done at a cost of \$3,464, or \$0.03871 per foot. Grinding bricks averaged 150 ft. for old rail and 163 ft. for new rail.

An important part of the roadway maintenance is the keeping of records to show at all times the progress on individual jobs and what the various crews have completed.

Forms used show the date when the work was started and finished on certain streets, when lanterns were placed at exposed work, information regarding employees, use made of air compressors, number of thermit welds made, trouble reports of signal and switch maintainers, call reports of the emergency truck, retirements and reports on improvement authorities, giving location of work, estimated cost, distribution of money spent, total of track and paving, and unit costs. Reports from the foremen are submitted to the superintendent's office where they are consolidated.

In the past year a total of 9,936 ties were installed, 1,718 for maintenance and 8,218 for construction. Of these 9,488 were creosoted pine ties, 40 were plain oak ties, 62 were International steel twin ties, 60 were channel steel and 286 were Dayton mechanical ties.

All creosoting is done in the company's own plant. Ties, poles and all structural timber subject to decay are treated with a preservative in this plant before installing. During the year the company creosoted by the empty cell process 37,839 cu.ft. of ties and bridge timber. A total of 28,822 gal., or 253,193 lb., of creosote was used for this work. The unit cost per cubic foot of timber for creosoting was \$0.1674.

A number of work cars and trucks, under the supervision of the roadway department, are used on the system. Included in this fleet are an emergency truck, equipped with winches, ropes, jacks and other tools, for taking care of any emergency which would block a line; three 2½-ton trucks, on each of which is carried a welder and an oxy-acetylene cutting outfit; a car for weed killing; a work car with an electric crane for handling rails; two other work cars for substitute service; a Differential dump car for hauling crushed stone; two 3½-ton trucks for general use; a 5-ton Differential truck with a three-way dumping body, for use in handling track materials; a tower truck for signal maintenance; a light truck for the switch tongue crew; another truck for servicing electric throw



Section of track being rebuilt with Dayton mechanical ties

devices; a sand truck, and a sand car.

The sand car is filled at the drying plant by forcing the sand through a pipe with air. The overhead tanks in the car-houses also are filled, in turn, by forcing the sand from the tank in the car. This system has proved a real time-saver and has caused no trouble whatsoever.

In the organization of the roadway department the superintendent has directly under him a chief clerk, a supervisor of switch and signal maintenance, an engineer and a roadmaster. Under the supervisor of switch and signal maintenance are those in charge of signals, special work, electric switches and the emergency truck. Under the roadmaster are the track foremen, operators of work cars, welders and grinders.

With the addition of modern machinery and the adoption of advanced methods, it has been possible to reduce the roadway force considerably. Four years ago 263 employees were in this division; now there are 155. As a result, the payroll has decreased from \$299,162 in 1927 to \$231,453 in 1930. The present weekly wage for foremen is \$43, for sub-foremen, \$37, and for work car motormen, \$40. Laborers are paid 30 cents an hour.

When it was found necessary to reduce the payroll of this department, it was decided that rather than discharge



Thermit welded joints are used on all track construction at Atlanta

employees it would be better to shorten the week. Accordingly, the five days of nine hours and five hours on Saturday, totaling 50 hours, was reduced to five days of $7\frac{1}{2}$ hours and $4\frac{1}{2}$ hours on Saturday, totaling 42 hours.

Safety at all times is stressed among the employees of the roadway division. During the year a meeting was held each month to discuss ways and means of eliminating hazards and preventing accidents not only to the company's own workers, but also to the general public. Committees were

formed among the workmen covering each phase of the work, and these committees were required to report at the meetings any hazards they may have noticed or had called to their attention during the month, or any item of improvement that could be made in the service.

All foremen have special compartments in their tool boxes for first-aid kits and during the year 69 minor accidents were treated on the job. These kits are all kept well stocked and goggles are furnished the men whenever necessary. There were no eye accidents during the year. In the last twelve-month period only six lost-time accidents occurred, four of which were due to the injured person's own carelessness. This figure compares with 32 in 1926 and 21 in 1927.

Automatic electric switches are installed at 122 loca-



In reconstructing this track the old wood ties were left in place and steel ties placed between them



New type "quiet" track, using concrete-embedded channels in which an asphaltic concrete is tamped around the rail



Cars operating over newly laid track, built under service with the aid of a concrete pulsator

tions on the system. There were 13,038,067 operations in 1930 and 159 failures, or 82,000 operations per failure. The cost of maintaining these switches was \$7,692.

The signal system of the company, also maintained by the roadway department, consists of 82 blocks. There were 8,671,250 operations in 1930 and 163 failures, or 53,198 operations per failure. The cost of maintaining the 135 signal units was \$8,086.

Systematic Maintenance Has Reduced Wire Breaks

ATTENTION is directed primarily to constant inspection in the maintenance of the overhead. Line crews watch at all times for defects and pay particular attention to such danger points as intersections, curves, hills and locations in front of carhouses. Contributing to the excellent record of this division is a thorough general inspection of the entire system each year. At this time all wire is measured and every joint examined. Any wire

year from 1923, when 26 breaks occurred, and a sharp decrease from the period around 1918 when, it is reported, there was an average of six breaks per day. While improving the overhead, maintenance costs have been steadily lowered until the cost per car-mile in 1930 was \$0.0039915.

In the past eight years 170 miles of new wire has been installed. This total includes the rehabilitation of the Marietta and Stone Mountain interurban lines in 1925 and 1926.

All overhead line clearances are measured to meet the requirements, not estimated, and all lines are fully insulated. The overhead fixtures have been greatly improved in the past several years. All frogs and crossings are fitted properly and have the correct angle. Instead of using open-pan frogs the type now installed permits the trolley wheels to travel from end to end of the fixture on the groove instead of the flanges.

Equipment for maintaining the system also has been improved. The company now has a trolley stringing



The overhead structure at "Five Points" and other intersections is checked frequently to note defects

that measures 50 per cent or less of its original diameter is marked for replacement. Other factors are keeping trolley wire aligned, observing clearances, making improvements in overhead special work and fixtures, installing wheel guards on the trolley poles, using a regular order of work for the crews, and employing precision methods to build and check the overhead.

Statistics of the line department show the results of carrying out the preventive maintenance policy and building to high standards. In 1929 the company was placed second out of 28 companies reporting to the A.E.R.E.A., with a record of eleven trolley breaks for a total of 13,726,601 car-miles run. Of these breaks two were due to wire and fittings and nine were due to burn downs, pull downs and other causes beyond the control of the maintenance force. In 1930 there were only seven trolley breaks for 13,518,839 car-miles. This record of 1,931,-263 car-miles per break in 1930 compares with 1,247,-373 car-miles in the previous year. The seven trolley breaks for last year represent a steady decrease each

truck which is self-contained. The reel fits on the truck and the wire passes back over the tower. When the truck gets to the end of the new wire the crew merely sets up the blocks and pulls up to the splicing ears. With this arrangement only one truck and five men are needed for stringing trolley in Atlanta.

Establishing a regular order of work has aided greatly in getting the most accomplished. First emergencies are taken care of. Then comes the regular work, and lastly there is the patrol work. The general foreman makes frequent inspections of all lines, checking their general condition. In addition, the gangs carry on a regular schedule of inspections, checking poles, span wires, trolley wires, insulators and fixtures, making repairs and replacements of the overhead when necessary. Parts that need immediate attention are repaired on the spot. If the span wires, trolley wires and fixtures have a good margin of safety they are left until they need to be replaced. It is the watchword to catch a defect before a break actually happens, to save time, money and delay of cars.

Summer is the regular repair season, and during it all regular replacements are made. The wire is inspected, of course, throughout the year, but in the summer the crew makes a most thorough check of each line. By this means it is possible to catch anything that might become unsatisfactory in the next twelve months. Because of this additional work a second crew of the same size as the regular one, five men, is added during the warm months.

Trouble crews work on three shifts. Two men and a driver are on each shift, except two men are on the evening shift. When not doing emergency work the trouble crews assist the regular crew. They are required to telephone the office to give information as to their whereabouts.

Guesswork is not tolerated. Level boards, micrometers, plumb bobs and tape lines are used so the entire system can be checked accurately. Particular effort is made to obtain correct alignment of the overhead with respect to the track. This precaution has been found very important in reducing troubles at curves and junctions.

New wire is strung with a tension of 3,000 lb. By

Each day the crew foremen report to the general foreman and receive orders for the next day. If it is necessary to repair overhead which gave trouble during the night the plans are altered. To facilitate the work of the crews all material is loaded on the trucks the night before.

Unit Replacement System Keeps Buses in Service

IN REDUCING road failures and in making the vehicles cleaner, more comfortable and more serviceable, the bus maintenance division of the Georgia Power Company has made an excellent record. Rigid inspection of the buses, complete overhaul, prompt repair of vehicles that have failed in service, an orderly procedure for all maintenance work, the use of modern labor-saving machines and tools, and a complete system of records are responsible for this showing.

During 1930 the Atlanta Coach Company operated 572,607 bus-miles. Vehicle-miles per pull-in averaged 2,883, but this includes failures not attributable to the maintenance department. The cost of maintenance per



Precision methods are used to align the overhead properly with the track at cathouses, curves and intersections

keeping the suspension flexible, it approaches the catenary principle. As the wire gets older and the section is less, this tension is slightly reduced.

A distribution line crew is not allowed to leave a patched-up span wire job. As soon as the distribution crew has transferred a section of poles the regular trolley crew follows to restore the trolley work to first-class condition.

The system of individual responsibility, used in the car shop, also is in effect in the overhead division. All troubles are traced back and the crew which last inspected or repaired a defective wire is asked to account for the failure. To assist in this, reports of troubles and repairs must be turned in by the crews. From these records the causes of all breaks are analyzed and an effort made to avoid a recurrence.

As for the other departments, a budget is prepared for the overhead division. Allotments of certain amounts for all operating divisions permit a careful planning of work for each month and for the entire year.

bus-mile, \$0.0721, is a little high in part because of the large number of other vehicles maintained in the garage and which increase the charges to the bus division. In carrying 1,142,914 passengers during the year, the revenue per bus-mile was 20.44 cents.

The 33 buses operated by the Atlanta Coach Company include fourteen double-deck, 54-passenger, gas-electric Fageols, three Model 65, 23-passenger Whites, ten Type X Yellows and six Type W Yellows. These are maintained at the Gilmer Street garage, located centrally in the city. In addition to these buses approximately 200 private automobiles of the Georgia Power Company, all air compressors, manhole pumps and service trucks are maintained at this garage.

During the year half of this entire fleet was completely overhauled. In six of the double-deckers new posts were installed and all side sheathing replaced with steel of heavier gage. Cross-braces of heavier metal were placed over the letterboards and the chassis were reinforced. New posts and metal sheathing also were installed on



Road failures of buses have been reduced greatly by rigid inspection and complete overhaul

seven of the Type X Yellows. These buses were equipped at the same time with new Buick engines. The three White buses, formerly used in Rome, were transferred to Atlanta and underwent a complete overhaul before going into service.

Buses are overhauled on a 50,000-mile basis. Individual records are kept for each bus and the day-by-day mileage posted. When a vehicle approaches the 50,000-mile mark it is removed from service. In overhauling the vehicles, every single part is checked and repaired or replaced. Bodies are gone over for defects and reinforced where necessary. Engines are completely dismantled and various parts are examined. In putting the engines in condition to operate another 50,000 miles, cylinders are rebored, pistons turned and valves ground, if necessary. The ignition system is checked very care-

fully, as are the fuel system, differential, transmission and all parts of the chassis.

To lessen the time of holding a bus out of service for repairs, an extra motor for each type of bus, except the White, is overhauled and kept in the shop ready for placing in the bus when the other engine is removed. Extra lighting generators and other equipment are kept on hand to allow unit replacement to a certain extent.

Shop facilities are adequate in every respect. In addition to the regular machinery this garage has a few special machines to facilitate the work. One is a piston turning and grinding machine, which is used for about 250 pistons each year. It is claimed that this device makes possible enormous savings. Another valuable machine in the shop is a cylinder grinder. Because of the large number of private automobiles and trucks maintained



All buses in Atlanta are maintained at this centrally located garage



Interior of the spacious garage, showing some of the double-deck buses

in addition to the regular buses, this machine is proving a real investment. In grinding from 35 to 60 engine blocks per year, there is a saving of \$8 each, or a total saving of from \$280 to \$480 per year on this \$2,500 machine. To see that all machines are kept in good condition and that all tools are in their proper place, a man is assigned to inspect the shops in detail every day and to watch at all times for misplaced articles.

Numerous pits are available in the garage to aid in inspecting and repairing the buses. In one part of the garage three longitudinal pits terminate in a cross-pit with a work bench along its full length.

Buses are painted once a year in a room which is closed off from the remainder of the garage. A heat-diffusing unit is used to maintain the proper temperature.

Every 10,000 miles buses receive a thorough inspection. At this time all parts are checked and repaired if necessary, and lubrication is done according to a regular schedule.

Brakes are tested daily to see if they are in proper working order and whether they are equalized. This practice has aided in reducing accidents and in lessening tire and brake lining wear.

Tires for the entire fleet are secured on a contract basis from one company. Daily and monthly records, individual and consolidated, show the mileage and any troubles encountered.

An emergency truck is stationed at the garage, for taking care of any trouble calls that may come in from the drivers. An individual record is kept of each bus failure, giving the exact location of the breakdown, the time, the trouble reported, the man who last serviced the bus, and other details. Composite records of these trouble calls are made, listing the calls by buses and months. These records show that fewer calls were received in 1930 than in 1929.

Much emphasis is placed on keeping the buses clean. Every night they are washed down on the exterior and swept and washed thoroughly on the interior.

In servicing the buses a complete record is kept of all gasoline and oil delivered to the vehicle. A composite record of gasoline and oil consumption for each bus is kept by months. If any vehicle shows a consumption higher than is expected an investigation is made to determine the cause. An Aqua hydraulic system is used to feed the fuel pump. Ethyl gasoline is used for all the company's vehicles. It is claimed that greater mileage, better performance in service and less maintenance result.

In all garage work safety has been stressed. To impress this upon the employees safety meetings are held twice a month. At these meetings employees are free to suggest ways and means of making the work safer and to bring up any ideas that they may have in regard to improving the methods and standards.



This arrangement of pits in the garage facilitates bus repairs



Special and regular machines in the garage shop effect savings in the repair work

CAR RESEARCH

Progressing

An extensive series of tests is now under way in the field laboratory of the Electric Railway Presidents' Conference Committee at Brooklyn

EXPERIMENTS under the auspices of the Electric Railway Presidents' Conference Committee are now well under way in the field laboratory established in Brooklyn. Prof. C. F. Hirshfeld, the committee's chief engineer, is in charge of the work, with a considerable force of research engineers and mechanics to assist him. The facilities of the field laboratory include an outdoor test track, 1,550 ft. long, and an adjacent four-track car shop for indoor tests, both being loaned to the committee by the Brooklyn & Queens Transit Corporation. A number of the most recently-built cars of electric railways in various parts of the country have been shipped to Brooklyn for purposes of



Simplified model to show spring action at various speeds. The wheel at the top corresponds to the car wheel. From it, a series of weights corresponding to the various elements of the car are suspended by springs corresponding to the car springs. When the wheel is rotated, the elements vibrate with the same characteristics as the elements of the car vibrate at various operating speeds

*Photos by William J. Ganz Company, New York
Producers and distributors of talking pictures.*

experiment. The general program involves the determination of facts from existing records, by analysis and by test and experiment. Investigations now under way at Brooklyn cover the third phase of this program.

DETERMINATION OF FACTS BY TEST AND EXPERIMENT

While a large amount of information was already available concerning the performance of existing equipment, the committee believed that further tests should be made. Those that have been made on various properties in times past have generally been limited in scope. More-



At left—Investigating time-distance characteristics of car performance. An extra rail with vertical slots at intervals through one side of the head has been installed between the running rails. The carriage is equipped with a light under the head of the extra rail, and a photo-electric cell above the rail to record the light impulses projected upward through the slots. At right—Test carriage attached at rear of a car, ready to record its acceleration and operation over the test track



over, they have been made under conditions which are not strictly comparable. The committee has decided, therefore, to undertake a thorough investigation to determine the operating characteristics of the modern electric rail car. The principal items being studied are: (1)



Testing the effect of acceleration on the passenger. This cage is accelerated at a known rate, while a slow motion picture records the action of the passenger from the time acceleration begins until it is sufficiently great to cause loss of balance.



Determining the strength of car bodies. A hydraulic ram is here shown pressing against the side of the car, while observers on the opposite side record the deflection



Observer on catwalk above car roof measuring deflection under various conditions of loading

structural strength of car bodies, (2) resistance during starting period, (3) starting characteristics, (4) balancing speed characteristics, (5) stopping characteristics, (6) riding qualities, (7) noise characteristics, (8) illumination, (9) heating and ventilation, (10) safety provisions, (11) passenger interchange provisions, (12) power requirements.

The tests being made in the field laboratory have not yet advanced far enough to permit the compilation, analysis and publication[®] of results. Before the engineering investigations could be undertaken, it was necessary to do a large amount of preliminary work in the development of measuring and recording instruments, as none was in existence suitable for the measurement of some of the things in which the committee was particularly interested. The necessary new instruments have now been developed, and comprehensive tests are under way to determine the facts concerning various phases of car design and performance. A motion picture film has been prepared for the committee by the William J. Ganz Company, New York, showing how some of the tests are being made. This film was shown at the Wednesday session of the American Association at the recent A.E.R.A. convention, at which time Professor Hirshfeld outlined the progress of the work. The illustrations accompanying this article are prints made from the film.

TIME-DISTANCE CHARACTERISTICS OF CAR PERFORMANCE

Tests are being conducted concurrently along a number of lines. One of the most interesting of these is the study of time-distance characteristics of car performance. Special apparatus has been developed for measuring the rate of car acceleration. The first step in this experiment involved the laying of an additional rail between the two running rails of the test track. Vertical slots were then cut through the head of the extra rail at measured intervals. A small carriage was designed to operate with two wheels on the extra rail and two wheels on the adjacent running rail. This carriage was equipped with a light so placed as to shine upward through the slot in the rail head, and a photo-electric cell held above the rail to record the light impulse projected upward from the lamp. The carriage is attached to the rear of the car under test. As it moves along the track, a succession of light impulses are recorded as it passes the slots. This has proved to be a convenient and effective means of measuring the rate of acceleration and operation over the test track. Accompanying illustrations show how the carriage is used.

In conjunction with the acceleration tests being made in the field laboratory at Brooklyn, certain other studies are being made at the University of Michigan covering the effect on the passenger. In these tests the passenger assumes a standing position on a small flat car which is accelerated at a definite rate, while a slow motion picture camera records his actions from the time the acceleration begins, until it is sufficiently great to cause loss of balance. By this means, the committee hopes to discover the maximum rate of acceleration to which a standing passenger can accommodate himself. An interesting fact developed by the experiment is that women, if facing forward, are able to retain their balance at higher rates of acceleration than are men. This is believed to be due to their use of high-heeled shoes which tend to move the center of gravity of the body forward with consequently greater resistance to falling over backwards.

Structural strength of car bodies is another important subject of study. For this purpose the car body is treated as a box girder and subjected to loads which simulate those experienced in actual service. A special framework has been constructed in which the car is placed for testing. Sand bags are then placed inside the body to simulate any desired passenger loading. Deflections under load are carefully measured by means of an inside micrometer caliper. A hydraulic ram is used to test the structural strength of the car under side-stress. This pushes the body against two supports near the ends on the opposite side, as shown in an accompanying illustration.

An ingenious device has been developed for use in connection with studies of riding qualities. This is a model consisting of elements corresponding to certain elements in an actual car arranged to show spring action at various speeds. A simplified model constructed for demonstration purposes at the A.E.R.A. convention is shown in an accompanying illustration. The arrangement of the elements in the model is inverted from that of the actual car, the wheel being at the top. From it are suspended weights representing the wheels, axles, truck frames and car body. Between the weights are springs representing the journal springs, the bolster main spring and the bolster auxiliary spring. When the disk at the top is rotated, the various elements of the model vibrate as do the corresponding elements in a moving car.

Operation of the model shows conclusively that the amplitude of vibration varies greatly with changes in speed. It does not, however, increase directly with the speed but increases to a maximum point, and then decreases again as the speed gets higher.

NOISE, ILLUMINATION AND VENTILATION TESTS

Noise characteristics are being carefully investigated. Tests are being made not only of the intensity of noise, but its quality. Some noises of comparatively small volume have been found to be particularly objectionable on account of the pitch. Measurements are being taken both inside the car, with and without passengers, and also on the street. The apparatus includes a so-called filter to differentiate various frequencies. The volume of noise at each frequency is measured and recorded. When a frequency is discovered which seems to be responsible for a large volume of noise, a careful investigation is made to trace it to its source.

Extensive tests are being made of car interior illumination. In this work, all windows are carefully covered with lamp black to exclude any outside light. Steady voltage for the interior car lights is assured by the use of a small motor-generator set with voltage control. The intensity of illumination at various heights is then carefully measured at selected points. From this it has been discovered that the intensity of illumination varies greatly in different parts of the car.

Investigation is being made also of heating and ventilation. The ventilating experiments are being made on the outdoor test track. The car interior is filled with a very rich mixture of carbon dioxide and air. Samples are then taken at frequent intervals to discover the length of time that is required to completely change the air in the car.

Up to the present time, the experiments have been confined largely to tests of equipment now available. As the program proceeds, however, it is planned to utilize

the results of these tests to develop new equipment designs which will in their turn be subjected to similar tests. Following the experiments in the field laboratory, it is planned to make further tests of equipment in actual service.



Measuring deflection of car underframe with inside micrometer caliper as the load within the car is varied



Investigator measuring the intensity of illumination on a white disk placed in a position corresponding to that of a newspaper held by a standing passenger



Extensive studies are being made of noise. Observers on the street are measuring with this apparatus the volume and character of noise emanating from passing cars



Queen Mary Road substation is built in a style commensurate with its residential surroundings

CONTINUED growth of the residential district in the northwest end of Montreal has necessitated the extension of the car routes serving it, and shorter headways between cars, particularly during rush hours. Obviously, this has called for more power and for a redesign of the direct-current positive and negative feeders to secure better voltage regulation with lower distribution losses. The load center had shifted so that

Montreal Tramways

Extends Use of

The location is in a high-grade residential community and it was essential that the building should have an attractive exterior in harmony with the general surroundings. For this reason it was decided to follow the old French Canadian architectural style, as shown in one of the illustrations. While the architects employed the traditional wall masonry with wide lime mortar joints and trimmed with local cut stone, steel is used for windows and trimmings. This was so handled as to avoid giving the building a factory-like appearance. An attractive roof was obtained by using asbestos shingles irregularly laid. The interior offers a pleasing color scheme. Quarry tiles of Welsh heather-brown are used for the floor of the main room, and the walls are painted greyish-green. Railings and protective wire screens are painted black, as

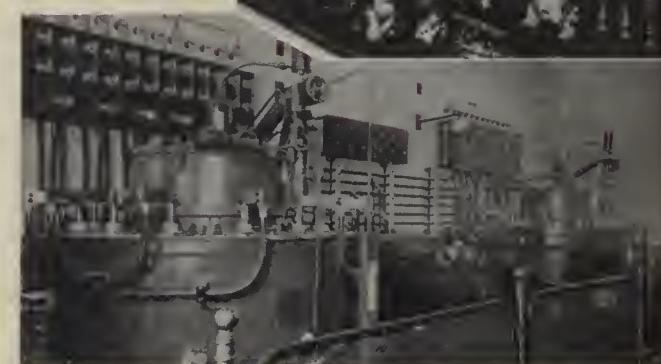
Direct-current circuits are handled from a board in the basement



All alternating-current circuits are centered in the switchboard on the main floor near the entrance

the station which previously fed these lines was no longer properly situated. Its equipment, consisting of one 1,000-kw. motor-generator set, had also become inadequate and somewhat inefficient. To meet the new conditions, the management of the Montreal Tramways decided to replace the station by a new one, better located for present and near future requirements, and equipped with up-to-date apparatus.

After careful consideration of the problem and of the continued good operating results obtained with mercury-arc power rectifiers in previous installations, it was decided that the new Queen Mary Road substation would be equipped with two such units.

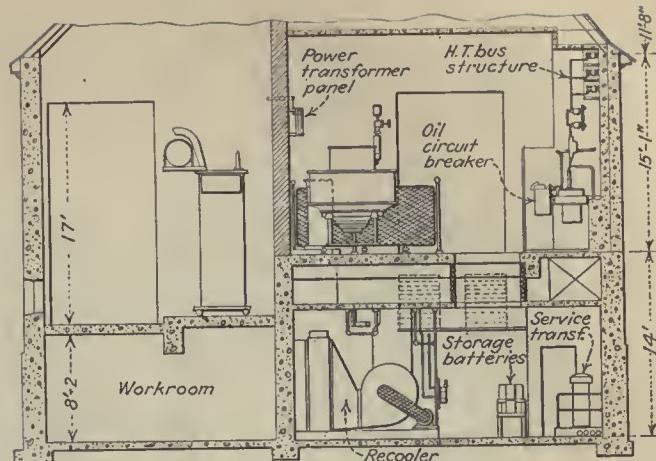


Two rectifiers each of 1,500 kw. rating form the main equipment of the station

Mercury Rectifiers

By

M. L. De ANGELIS
Assistant Electrical Engineer
Montreal Tramways



was a stenciled border running round the top of a painted dado.

In the main, the building is very similar to that of the Viau substation which formed the subject of an article in ELECTRIC RAILWAY JOURNAL of September, 1930. Its approximate over-all dimensions are 60 ft. 6 in. by 47 ft. by 40 ft. 11 in. high.

The basement is carefully waterproofed. The roof is of precast "Aerocrete" slabs covered with double-dipped asbestos shingles. The high-tension oil circuit breaker and bus-bar cells are of concrete, and are located along one side of the main room. The rectifiers are on the opposite side, on the same floor as the main control switchboard.

However, in order to reduce to a minimum the transmission of noise due to the transformers, and to keep the appearance of the building as attractive as possible, even on the sides, the two main transformers were installed in separate cells opening on a longitudinal passage with a door at the rear of the station. A hook has been cemented in the roof above each transformer for lifting the core and winding when necessary.

The electrical equipment, supplied entirely by the Canadian General Electric Company, includes:

Two 1,500-kw., 12-phase, 600-volt, non-compound steel tank mercury arc rectifiers with a.c. ignition and capable of 50 per cent overload for two hours.

Two 1,590-kva, 1,300/935-volt, 60-cycle, delta-quadruple zig-zag 3/12-phase, self-cooled transformers for the rectifiers, capable of equal overloads.

One 5,000-amp. series reactor rated to stand 150 per cent load for two hours.

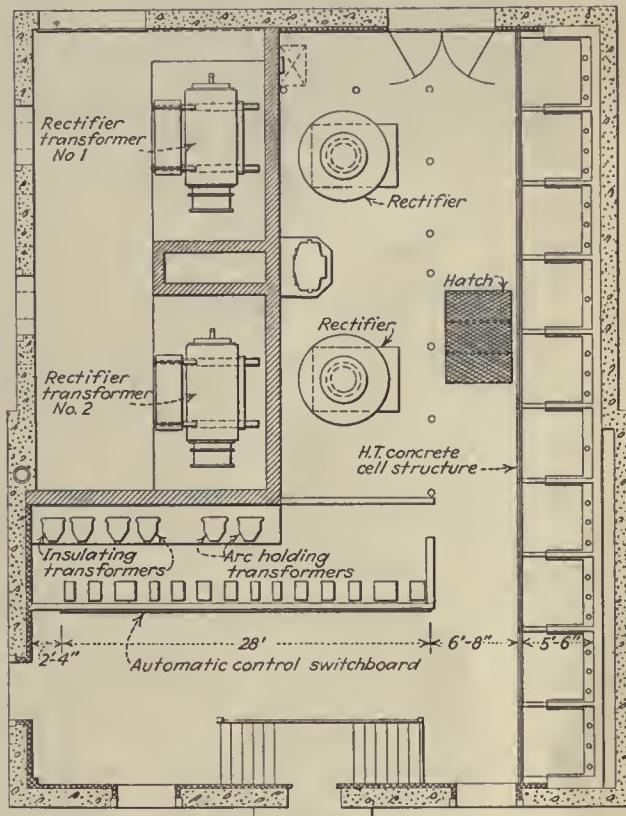
One bake-out transformer with necessary resistors.

Two self-cooling systems for the circulating water.

One bank of three single-phase 13,000/220/110-volt, 20-kva. transformers for the station service and control circuits.

One complete automatic switching equipment designed for the control of following circuits: Two incoming high-tension lines; two outgoing high-tension lines (not yet in service); two 1,500-kw. mercury-arc rectifier units; one 60-kva. station service bank; eight 2,000-amp. d.c. automatic reclosing feeders; one synchronous selector supervisory control equipment in substation and load dispatcher's office, with necessary storage batteries.

All the above apparatus is identical to that installed in the Viau substation. As in the latter station, the load responsive control can be cut out and the equipment operated by manual load control from the main switchboard in the substation. This is obtained by a suitable multi-pole, throw-over switch, mounted on the switchboard and operated, when necessary, by the inspector.



Compactness is a feature of the new Queen Mary Road substation of the Montreal Tramways

However, the alternating-current over-current protection for each unit and the control of the anode and tank heaters is maintained under automatic control. To prevent the load dispatcher from performing faulty switching which might, possibly, introduce a hazard to life or property, the circuits are so interlocked as to render totally inoperative the supervisory control when the throw-over switch is set into the "local control" position; but proper automatic indication is given to the load dispatcher to warn him that the station equipment is under the control of the station inspector.

The supervisory control apparatus is of the synchronous selector type, completely wired for 23 circuits of which, at present, seventeen controls and 22 indications are in use.

Results with the supervisory equipment for the Viau substation, which has now been in continuous service for more than one year, have been so satisfactory it is proposed to extend its use to other stations.



Loading platform in Cincinnati with sidewalk cut back to facilitate passage of vehicular traffic. Illumination is provided by lights suspended from span wires

Public Sentiment Favors Loading Platforms in Cincinnati

CINCINNATI began installing concrete loading platforms protected by substantial steel barricades in 1926, under an arrangement by which the city builds the platform and pays for the lighting equipment and the Cincinnati Street Railway pays for the current consumed in lighting the platforms. Some 280 of these platforms are now in use. They afford ample protection to passengers boarding street cars and alighting from them, and they also permit motor traffic to move past standing cars. Although motorists hit the platforms sometimes and occasional serious accident occur, public sentiment seems to be generally in favor of their use. Every time a serious accident occurs, however, certain ardent motor enthusiasts question the desirability of the platforms. The following editorial, which appeared in the *Cincinnati Enquirer* on Sept. 28, is a particularly strong argument favorable to the platforms.

Loading Platforms

The question of the desirability of loading platforms, which has been more or less in dispute since the first one was installed, came up again Friday at a safety conference in the office of the City Manager. Motorists who believe in giving the pedestrian a chance will agree with the conference that the platforms are a necessary evil. They do increase somewhat the hazards of driving on the streets, especially the hazards of careless driving. But their value in protecting people afoot who are waiting to board street cars outweighs that disadvantage.

Without the platforms a person who wishes to board a car on any of the wider, heavily traveled streets would do so at the risk of life and limb. In the rush hours he would scarcely be able to get to the car lines at all. The only suitable alternative to the safety platform is to move car lines to the curb and route motor traffic down the center of the main highways. The cost of such a move would be prohibitive.

Another striking editorial on the subject has just appeared in the *Cincinnati Post*, local Scripps-Howard

paper, in its "Cincinnatus Column," a human interest editorial feature of the paper, as follows:

Safety

There seems to be a difference of opinion among heads of departments at City Hall over the usefulness of street car loading platforms. Some believe that because motorists frequently hit them they should not be placed in the streets.

Cincinnatus leaps to the defense of the loading platforms. He holds that it would be just as logical to remove all electric poles and trees that line the streets. Reckless motorists sometimes hit them, too. No careful driver ever hits a loading platform. The fellow who hits one either is negligent in not having his car under control or he is not looking where he is driving. The only exception is where he is crowded into the platform by another negligent driver.

Loading platforms are more than loading platforms. They are isles of safety for pedestrians crossing streets heavy with traffic. On arterial highways, filled with rush-hour traffic, it is almost impossible to cross the street where there are neither traffic lights nor loading platforms. If loading platforms were taken away traffic lights would have to be installed at every suburban intersection for the safety of pedestrians. How would the hurrying motorists like that?

Clearance Marker Speeds Traffic

IN COMMON with other street railways the San Francisco municipal lines suffer many traffic delays occasioned by motorists who carelessly drive partly on the car tracks and allow themselves to be held up in a traffic line in such a way as to obstruct street car movement. The general use of white street lines as traffic markers gave rise to the idea of painting a yellow line parallel to the car tracks to indicate the clearance necessary for cars.

Such lines have been painted along Market Street by a painting machine attached to the front step of a street car and operated from the air compressor.

Trolley Bus System Will Soon Serve Kenosha

Twenty-two trolley buses will completely replace present street car and gas bus system. New routes provide for a better layout of service throughout the city. Construction of vehicles, overhead and carhouses now in progress

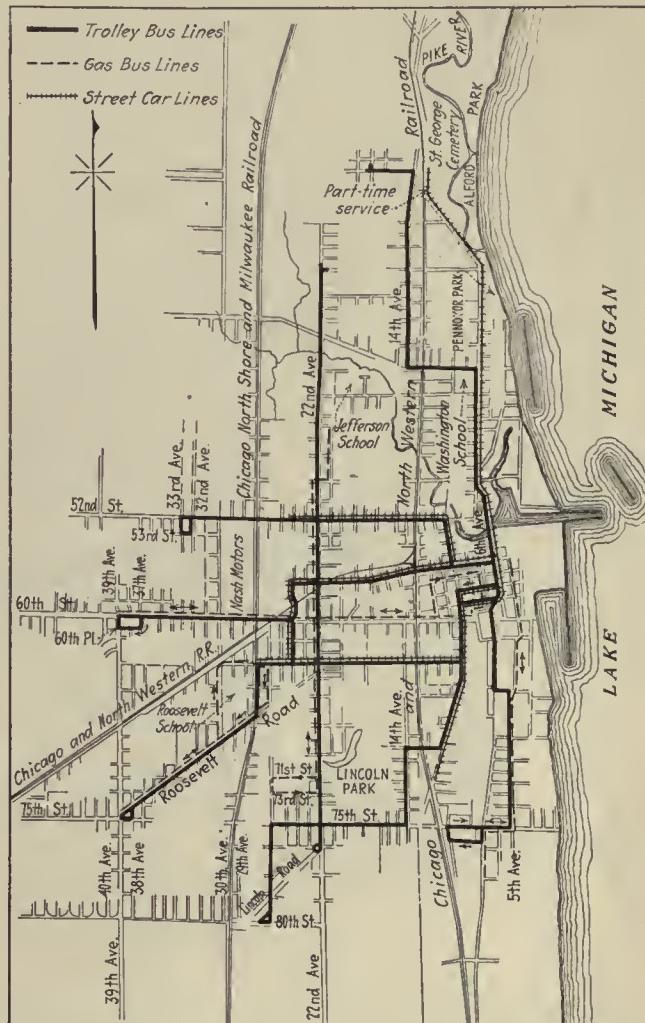
WORK is actively under way for the complete replacement of street car and gas bus services by a trolley bus system in the city of Kenosha, Wis. On Sept. 22, 1931, the Wisconsin Gas & Electric Company placed orders for 22 vehicles, and concurrently began the remodeling of a building to store and maintain the new equipment. Construction of the new double-line overhead system was started on Aug. 20. Ten of the new vehicles are being built by the St. Louis Car Company, St. Louis, Mo., and twelve by the General Motors Truck Company, Pontiac, Mich. The orders call for deliveries to begin in December, and to be completed during January, 1932.

Service will be inaugurated as soon as the vehicles are received and the operators are given a few days' instruction and training. The first line, extending from the northern extremity of the city southward through the central business district, and then westward to the outlying section of the city, will comprise 5.35 route-miles. It will be equipped and service will be started on it as soon as seven trolley buses are received, final overhead adjustments and connections made and the operators trained. A temporary gas bus service will be operated during the transition period, when the railway overhead will be cleared and the new trolley bus wires and overhead put in position. Additional replacements will follow in a similar manner until the system is completed some time in January.

SYSTEM WILL HAVE FOUR ROUTES

When completed, the new trolley bus system will consist of four lines, each of which will be designated by a color name. Appropriate color markers will appear on the trolley buses to identify them. The route described above will be known as the green line. The red line, with 5.70 route-miles, will serve the south and southwest sections of the city. The blue line, 4.10 route-miles, will run from the southeast section, pass through the central business district, and then extend westward. The orange line will be a straight north-and-south route, 2.90 miles long, intersecting all other lines about a mile west of the downtown area, and serving a growing commercial district and adjacent industrial areas.

The new system adds very little to the total route-miles of the combined bus and street railway system, although the new routing does provide a very much better layout for service in Kenosha. The total route distance of the new system is 18.10 miles. This involves the construction of 16.4 miles of double line overhead. Six loops and two wyes will be installed to permit turning at the ends of the four routes. Three lines cross the Chicago, North Shore & Milwaukee Railroad high-speed electric line and there will be five subway crossings of the Chicago & Northwestern Railway. Seven sets of



Four trolley bus routes will replace all street car and bus service in Kenosha, Wis.

electrically operated trolley wire frogs and switches will be used for branch-offs where more than one line is operated over a street.

Double lines of No. 00 round, hard-drawn copper trolley wire will be used throughout the system, with positive and negative feeders over part of the system. The present 600-volt conversion equipment will be used.

The accompanying tabulation gives general specifications of the new vehicles.

Long study resulted in the decision to place a trolley bus system in Kenosha. Failure of the existing street railway to earn enough to warrant extension and its inadequacy even with the supplementary gasoline-powered bus lines to meet the transportation needs of

Specifications for the Kenosha Trolley Buses

Name of railway.....	Wisconsin Gas & Electric Co., Kenosha, Wis.
Number of units.....	22
Type of unit.....	One-man trolley bus
Number of seats.....	42
Builder of body.....	10 units, St. Louis Car Co.; 12 units, General Motors Truck Co.
Date of order.....	Sept. 22, 1931
Date of delivery.....	December-January
Weight total.....	15,300 lb.
Length over bumpers.....	33 ft. 0 in.
Length over body, 10 units.....	31 ft. 9 in.
Length over body, 12 units.....	32 ft. 5 in.
Wheelbase, 10 units.....	193 in.
Wheelbase, 12 units.....	213 in.
Width over all.....	8 ft. 0 in.
Height, road to roof, 10 units.....	112 in.
Height, road to roof, 12 units.....	106 in.
Window post spacing, 10 units.....	38 in.
Window post spacing, 12 units.....	35 in.
Roof.....	Arch
Doors.....	Front end
Air brakes.....	Four-wheel, also electro-dynamic
Armature bearings.....	Ball
Axles.....	Timken, trolley bus type
Car signal system.....	12-volt buzzer
Conduit.....	Flexible metal
Control.....	General Electric Co., special
Couplers.....	Drawbar attachments
Curtains.....	At rear of operator, none on windows
Destination signs.....	Illuminated
Door mechanism.....	Type not settled
Doors.....	Folding
Fare boxes.....	Company's type
Gears and pinions.....	Worm, integral with rear axle assembly
Hand brakes.....	External contracting on axle shaft or on motor drive shaft
Heaters.....	Accelerating-dynamic braking resistors with auxiliary 600-volt circuit
Headlights.....	Trolley bus type, 12-volt
Headlining.....	Builder's standard
Interior trim.....	Metal, enameled in color
Journal bearings.....	Roller
Lamp fixtures.....	10 dome type
Motors.....	Two, 35-hp. General Electric
Painting scheme.....	White and maroon
Roof material.....	Wood, canvas covered
Saab.....	Metal
Seats.....	Semi-bucket type, leather upholstered
Seat spacing.....	10 units, 29½ in.; 12 units, 31 in.
Slack adjusters.....	Integral with air brake mechanism
Steps.....	Stationary
Step treads.....	Insulated
Trolley catchers.....	Two
Trolley base.....	Two, trolley bus type
Ventilators.....	Special, adapted to circulating air system
Wheels, type.....	Heavy duty, 9.75 x 24 in.
Wheelguards and fenders.....	Trolley bus type

the community prompted a study of the various available types of systems as a substitute capable of meeting the requirements of both the community and the utility. Rerouting of lines embodied in the plan finally submitted made it possible to cover the city to much better advantage. The only changes that were made were for the retention of routes over certain streets now used by street railway lines.

A comprehensive city plan with a really fine civic center is being progressively executed by the city. Relocation of the tracks on widened streets would have required a heavy expenditure. Elevation of the main line tracks of the Chicago & Northwestern Railway, which runs north and south about a half a mile west of the downtown business district, called for a considerable additional sum to double track the subways. It was decided that these expenditures were not warranted by the revenues obtained from the street railway. The necessary rebuilding of a considerable amount of track on the system set up requirements for capital expenditures not available in the reserves usually set up to cover replacements of this character.

These major items and the increasing cost of railroad crossing track, overhead and equipment maintenance, and the bus replacements necessary in the next five years, coupled with the inadequacy of the system even after the expenditures for capital account and maintenance,

caused the company management to entertain a proposal from the city to submit a plan for a system to replace the rail and bus services. The result of the negotiations is the trolley bus system now being installed.

Warning Sign Reduces Accidents



Cars of the El Paso Electric Company equipped with the illuminated warning sign have reduced accidents to passengers

ILLUMINATED safety warnings have been developed by the El Paso Electric Company for mounting at the entrance or the exit of cars and buses. The sign is mounted on a suitable support without obstructing the passageway in the vehicles.

The device consists of a rectangular frame, which can be placed vertically or horizontally, with two open sides arranged to hold transparent aluminum slides bearing the stenciled warning signs. Cel-O-Glass is placed behind the stenciled sign. Illumination is obtained from a lamp placed in an open-front metal casing that is part of the device. In the street cars, the lamp is connected to the regular lighting circuit.

These signs can be clamped to the fare box post on the platform so that all passengers will read them as they board or alight from the vehicle. The arrangement permits a clear view of the sign to all passengers seated in the car. This sign can also be used in a step riser beneath the entrance door to the street car or bus. The removable slide of the device permits the use of a variety of safety messages that can be changed as desired. The sign is compactly built and is of an attractive design.

The El Paso Electric Company has been using the new safety sign on cars operated over one of its principal lines for more than a year with excellent results. It has proved to be an important factor in contributing to the increased safety of operation.

Sunday Passes Increase Riding and Revenue in New Bedford

BY HAROLD E. POTTER

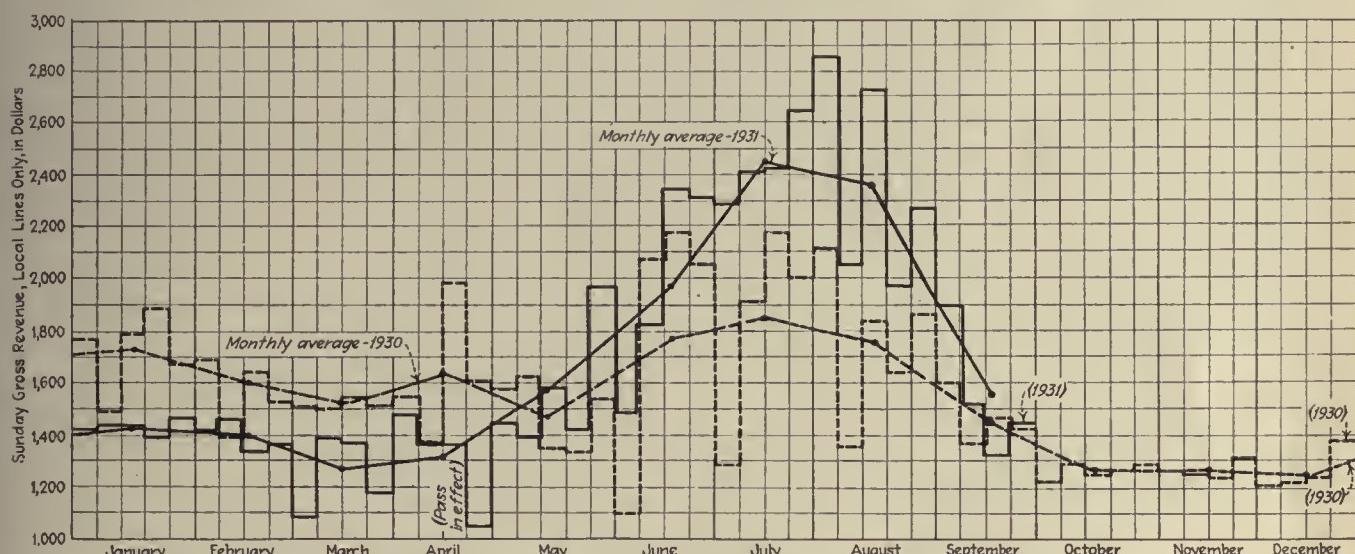
Assistant Superintendent of Transportation Union Street Railway,
New Bedford, Mass.

CONFRONTED with a decrease in Sunday revenue of 10 to 20 per cent from 1930, the Union Street Railway, New Bedford, Mass., cast about for a stimulus to business. As a result, on April 19 of this year the sale was begun of a 25-cent Sunday pass which entitles the holder to any number of rides on any of the company's rail or bus lines except those between New Bedford and Fall River. The results of the innovation have been more than satisfactory.

New Bedford has many attractions, among them three large bathing beaches, three amusement parks, and several recreational parks, all reached by frequent trolley service. New Bedford, being an industrial city, has suffered from the depression, particularly in the textile

ing that some kind friend would take them for an automobile ride. Now hundreds of families leave their homes early Sunday mornings to purchase Sunday passes and enjoy an all-day outing at the shore resorts or amusement parks. Many of these places are reached by lines on which open cars are run during the summer, as it is believed that the people who visit such places appreciate the opportunity to "ride in the open." Older people have formed the habit of purchasing a pass and visiting their friends in the city or surrounding towns. It has been years since the company has experienced trolley pleasure riding during the evening hours.

Before the pass was offered to the public, the riding characteristics of the patrons were analyzed carefully.



Sunday revenues on New Bedford local lines have increased as the result of the Sunday pass

industry. The people needed inexpensive recreation, and this the Sunday pass provided. The pass has certainly increased the riding habit in New Bedford and surrounding towns, and has built up distance travel, which had decreased quite markedly on account of the relatively high tariffs. Many people who were inclined to think of trolley riding as a rather inferior mode of transportation have now become enthusiastic boosters for the company. Hundreds of boys and girls save their money all the week so as to purchase a Sunday pass and ride all day for 25 cents. The training of these young people to be trolley-minded is important when one considers how much pressure has been brought to bear to make the younger generation automobile-minded.

The pass also has proved that not all the loss in riding went to the automobile. Many persons could not afford to take their families for an extended trolley or bus ride, and were compelled to remain at home on Sundays, hop-

There were some who thought that people would not be willing to make an investment of 25 cents for one day's transportation. However, as many as 7,232 people bought passes on Aug. 16. It was questioned whether the additional revenue from new patrons would offset the loss of regular patrons already riding through two or three zones. Third zone riding under the regular rate of four tokens for 25 cents was less than 2 per cent of the total, and second-zoning riding varied from 5 to 10 per cent. Therefore, it was felt that enough new riding would be obtained to more than offset the loss on patrons who already paid more than four fares a Sunday. This assumption proved to be correct.

In addition to the regular newspaper items that introduced these Sunday passes to the public, use was made of hand fliers inside the cars, large dashboard signs and a limited amount of front-page newspaper advertising.

It was found that considerably more passengers could

The READERS' FORUM

Historical Data Amplified

NEW YORK, N. Y., Oct. 14, 1931.

To the Editor:

After reading with particular interest the contents of your special issue of Sept. 15, 1931, I trust that I may make some amplifying comments, and, in the interest of historical accuracy, a few corrections.

In the list of "Important Dates in the Electric Railway Industry," the invention of series-parallel control is credited to Dr. Hopkinson in 1881. This is correct as far as it goes, but prior to Hopkinson's filing his provisional English patent in that year, the first record date of his invention, this control had been developed by Sprague, at the U. S. Government Torpedo Station, Newport, R. I., and tested for Prof. Moses G. Farmer, then on duty there, in a double-armature new "inverted" type of dynamo, the forerunner of the all modern alternating-current generators. These inventions, therefore, were made thousands of miles apart, independently and almost simultaneously—just as that of the three-wire distribution system was made independently by Messrs. Hopkinson and Edison.

The under-running trolley was invented by Sprague in a universal form, in contemplation of a project for electrifying the Metropolitan District Railway of London, while he was a juror at the Crystal Palace Exhibition in 1882, and in a limited non-reversible form by Van Depoele in the United States in 1883. In a subsequent interference, the testimony as to Sprague's conception was declared not admissible prior to his return to the United States in May, 1883, and, in consequence, Van Depoele was awarded priority in the United States. He did not use a reversible pole trolley until after the equipment of the Richmond road by Sprague in 1887.

The Bentley and Knight separate truck, on which motors could be mounted, was not the first example of this method of construction. It was developed by Sprague in 1885, described by him in a paper read before the Society of Arts of Boston in December of that year, and was for several months demonstrated with a standard truck and dual motor equipment at the Durant Sugar Refinery, N. Y., and on the 34th Street Branch of the Manhattan Elevated System, being fully illustrated and described in *Electrical World* of Sept. 25, 1886.

In the "wheelbarrow" suspension of the early Richmond motors, which were only of $7\frac{1}{2}$ -hp. capacity each and of comparatively light weight, the free end was hung from the car body, but the Brill Company soon developed a special truck for street railway cars, to take care of the succeeding larger motors, a model of this truck being now in the Sprague office.

Incidentally, the sectional field winding of that early motor was not abandoned "because of unsatisfactory operation with a weakened field," for these motors were of exceptional efficiency, but because of the frequent breakdowns, with the comparatively high potentials used, on account of the then crude methods of construction.

The first "heavy" electric locomotive seems to have

be carried by the regular service, as the empty seats ran quite high. It also was determined that the higher schedule speed on slightly decreased headways in effect on all lines on Sunday mornings need not be altered. In several months the operating costs did not increase at all. During July the cost of the service was increased about \$450 with more than \$3,000 additional revenue.

Immediately following the inauguration of the Sunday pass, an upward trend in revenue and patronage was noted. Before its advent, the Sunday revenues of the New Bedford local lines were off 16.5 per cent from last year. Since its inauguration the receipts show an average increase over 1930 of 18.4 per cent. In August a 20 per cent loss in revenue was changed into an increase of 35.2 per cent. The decrease on one Sunday in September was because the weather was cold and rainy this year. Despite this more money was taken in for the Sundays in that month than during September, 1930, when every Sunday was pleasant.

During the period in which the pass has been in effect, the revenue from it has ranged from 20 per cent to 65 per cent of the total Sunday receipts. Ten weeks after its use began, the pass revenue exceeded that from the regular token-paying passengers, and continued so without exception until the third Sunday in September. No attempt has been made to determine the number of rides taken per pass. Making the very conservative estimate of only four rides per pass, the number of such riders exceeded the total before the pass was offered.

Passes are sold by all car and bus operators. It will be noted that 40 per cent are sold before noon and about 56 per cent between noon and 6 p.m. Considerable rivalry in selling passes exists among the men, and it has done much in stimulating them to be real salesmen of transportation. Cars have been better loaded and every line has increased its earning power.

During the summer months an additional pass was sold for 75 cents that entitled the holder to unlimited trolley rides in New Bedford and Fall River and also between the two cities. This pass increased the revenue of these lines, but it did not prove as popular as the 25-cent city pass.

Concrete Loading Platforms at Pittsburgh

DESIROUS of reducing the hazards for both street car patrons and motorists to a minimum, the city of Pittsburgh is installing a total of 50 loading platforms, embodying several advanced features. The platforms, designed by the Bureau of Traffic Planning, are of concrete, 4 ft. wide and raised 7 in. above the street surface. A chain railing supported on 3-in. pipes along the entire edge of the platform, except for one point of entrance, prevents pedestrians from leaving at any other point. The forward end of the platform is guarded by a heavy concrete bumping block, 32 in. high and tapering to the level of the concrete platform at a point 3 ft. from the forward end of the block.

Visibility of the zone is increased through the use of a flashing electric beacon, mounted at a height of 9 ft., with a light to illuminate the platform and one to light the bumping block. A yellow diamond-shaped sign 18 in. square, marked "safety zone," is mounted at a height of 3 ft. 6 in. on the beacon light supports. The cut out letters of this sign are illuminated by red Neon lights.

been that designed by, and built under the direction of, Sprague, Duncan and Hutchinson for Mr. Henry Villard, president of the Northern Pacific Railroad in 1892-3. This was a 60-ton locomotive of 1,000-hp. capacity, intended for direct-current operation at 800 volts. It had four gearless motors, the armatures being carried on the axles and the field magnets on the axle boxes. The main controller was mechanically operated by a follow-up pneumatic attachment under manual control. The framework was built by Baldwin, and the motors by Westinghouse. The locomotive was never put into actual service. A description of this locomotive appeared in the *Railroad Gazette* of Oct. 13, 1893.

The multiple-unit system of control was actually invented in 1895, and for two years vain efforts were made to get the opportunity to demonstrate its advantages on the Manhattan Elevated Railroad. But in 1897 Sprague took a contract, at first personal, for the equipment of 120 cars on the South Side Elevated Railroad, and the first equipments were put into operation on the Berne Bank tracks of the General Electric Company at Schenectady in July, 1897. It, of course, first came into general use on the equipments for elevated and subway railroads, then on interurban roads, and finally on many surface cars, for it quickly demonstrated that for mass movement it had no possible competitor.

That it has become of vital importance in main line electrification is well illustrated in Mr. Withington's article which shows many cars of this type in use throughout the country. Not only are the cars equipped with multiple-unit control, but it is important to note that certainly most, and probably all, of the locomotives are also equipped with it, so that when deemed necessary two or more units may be grouped and controlled from a single point.

It may be further noted that these equipments, both car and locomotive, include direct-current operation from 600 to 3,000 volts, and alternating-current operation of single and multi-phase motors from a single-phase 11,000-volt trolley line; and on mountain divisions regeneration, first demonstrated by Sprague in 1886 on the Manhattan Elevated, is used both for return of power to the line and for braking the train.

Taken altogether, it may be well claimed that the use of electricity for industrial power and traction purposes, vertical and horizontal, transcends in its influence upon human welfare its use for light and heat.

FRANK J. SPRAGUE,
President Sprague Safety & Signal Corporation.

A Trolley Bus in 1882

BERLIN-STEGLITZ, Oct. 7, 1931.

To the Editor:

I have read with great interest the splendid article on "The Trolley Bus," by Clifford A. Faust, in the Convention Number of *ELECTRIC RAILWAY JOURNAL*. You mention a trolley bus of Siemens & Halske of 1899, saying that this bus was the first in the world. This is not quite right. The first trolley bus was built so far back as 1882; the vehicle made trial runs on a high street between Berlin and Spandau.

In this regard, I may draw your attention to my article on trolley buses in the German technical journal *Verkehrstechnik*, No. 17, of April 24, 1931, pages 209-212. Here you will find too that this really first

trolley bus has the peculiar name "Elektromote." The bus was also constructed by Siemens & Halske.

WALTER JACOBSON, DIPLO-ING.

[The author of the article in the *JOURNAL* had at hand a report that Siemens & Halske had installed a trolley bus in 1882, but, since no confirmation could be obtained or no descriptive material located, the reference was omitted in the historical review. Two other prior claims were omitted for the same reason.—EDITOR.]

Economical Public Transportation Has Growing Appeal

DALLAS, TEX., Oct. 7, 1931.

To the Editor:

Although the past few years have been indelibly marked in the memories of transportation men as a chaotic period of uncertainty and declining revenues, it is reasonable to predict that the depression will be the major influence in a radical readjustment in standards of living which will react most favorably for that basic industry which has perhaps suffered most acutely.

Since Wall Street's aerial debauchery reached its climax in a tail-spin catastrophe, there has been an inevitable deflation in almost all lines. Mr. Citizen has taken advantage of the occasion to pause and take an inventory, balance his books, and have a heart-to-heart conference with himself on the sublime folly of reveling in luxuries which came on the heels of unearned prosperity.

But he had not been entirely at fault in believing that his holiday would continue indefinitely; he had been influenced by the stalwart leaders of commerce and industry, who, with a wary eye riveted to the eccentric gyrations of the ticker tape, had sanctioned indiscriminate wage increases, bonuses and burdensome obligations as nonchalantly as they had expanded their far-flung activities to care for a staggering volume of sales—sales which frequently proved to be too questionable credit risks.

As the new day dawns, there will follow revised standards of living, equitable standards of values, and such prudent spending that the proverbial Scotchman will blush with shame. The wage-earner, the potential street car rider, has paid dearly for his indulgences, and now he will unconsciously follow the striking example of rigid economy practiced by the electric railway industry during the time when others were reveling in their respite from care and worry.

It will be found, in all probability, that Mr. Citizen's earnings will be less, but he will have a higher regard for his job than ever before. As a consequence, he will give much serious thought to those forgotten virtues—economy and thrift.

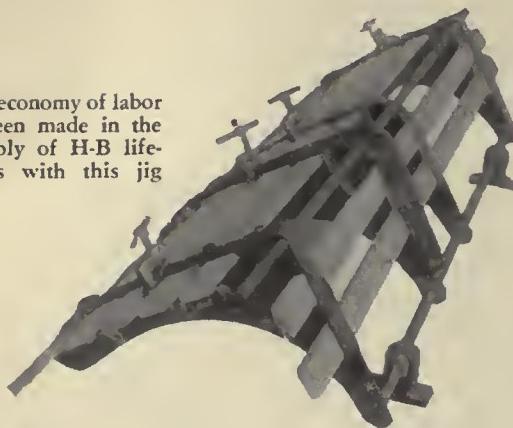
The family motor car, a dependable as well as inexpensive vehicle, is here to stay. But Mr. Citizen, when he fully awakens from his troubled sleep, will rub his blood-shot eyes with an unsteady hand, and, stuffing a sheaf of assorted, unpaid garage bills in his pocket, will stroll down to the old faithful street car line. Then, during a comfortable, restful ride to his work, he will meditate generally upon the fallacy of living beyond his income, and specifically, he will be concerned with the expense and worry of trying to compete with the most economical and safe transportation facility in the United States.

RUFUS C. BURLESON,
Engineer to Supervisor of Public Utilities.

PRACTICAL IDEAS for the

Maintenance Man

Great economy of labor has been made in the assembly of H-B lifeguards with this jig



H-B Lifeguard Assembly*

By R. WALKER AND H. SMITH
Toronto Transportation Commission

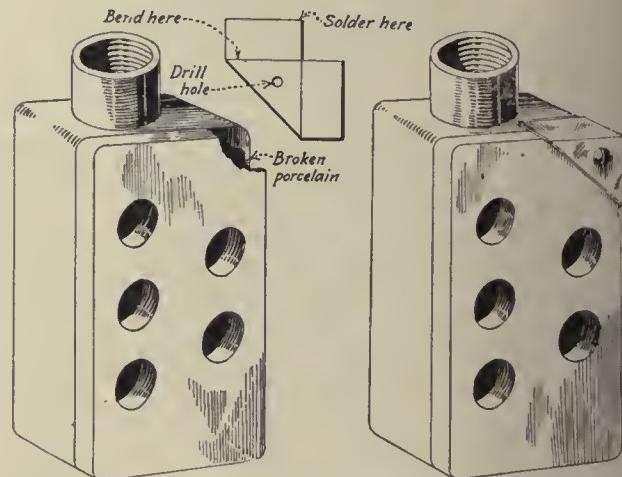
SEVERE winters have played havoc with the H-B lifeguard equipment on the Toronto Transportation Commission cars, and owing to variations in equipment, the assembly of the salvaged and rehabilitated parts gave a lot of trouble. To avoid this in the future, the assembly jig shown in the illustration has been built. It is a metal frame fixed to a shaft that rotates in two bearings. The frame follows the inside contour of the finished carrier, and has slots in which are placed the wood slats and the necessary stops for locating the metal parts, the half oval frame, center stay, carrier lever and carrier bar. The slats are lined up from a stop at one end. Clamps are provided to fasten the metal parts in place, keeping them in close contact with the wood parts of the assembly. The metal parts are uniformly shaped and drilled from jigs. An electric drill is now used to bore the bolt holes in the wood slats. The jig is then turned around on the shaft, and bolts easily inserted. This jig eliminates the former separate operation of boring the slats and trying to mate them with the various metal parts.

It is apparent that this jig will be very useful in the rapid production of carriers in quantity, and with a very considerable labor economy compared with the former method. In addition, all the cradles and parts produced by this method will be interchangeable.

Repairing Porcelains of Junction Boxes*

By FARRELL TIPTON
Electrician
San Diego Electric Railway

REPAIR of broken junction box porcelains on the San Diego Electric Railway has reduced the expense for new porcelains. Most of the broken porcelains occur on the latest type cars of the San Diego Electric Railway, which are equipped with junction boxes for the motor leads terminating at the car body. Frequently the corners of the junction box are broken by the con-



By attaching brackets to the broken corners of junction boxes added service is obtained

stant vibration of the car and the resulting pull of the motor leads. These boxes are repaired in a short time by screwing on a metal bracket at the broken corner. This repair avoids the necessitating of detaching the jack-knife connectors from the motor leads in replacing the broken porcelain with a new one.

Rebuilding Tap Bolt Holes for Motor Housings*

By J. MONDOUX
Ottawa Electric Railway



Motor housing with a nut welded in for tap bolt hole and one ready for welding

MOTOR housings with threads for the tap bolts worn out have been reclaimed by the Ottawa Electric Railway by boring out the tap bolt holes to a 2-in. diameter, and inserting standard nuts turned down to fit the holes. A beveled edge is turned on each nut to allow space for welding them to the housing. The outside diameter of the housing was built up by welding and machined, when necessary, to secure a better fit in the motor casing. However, when only nuts are welded in, the welding spelter is below the machined surface of the housing, and machining is unnecessary. When the threads in the nuts are stripped again, it is only necessary to bore out the old nut and insert a new one. This can be done for any casting or forging with holes having stripped threads.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Armature End Play Calipers*

By H. CORDELL
Master Mechanic
Chicago North Shore & Milwaukee Railroad

ARMATURE end play can be exactly determined before assembly by a caliper device developed on the Chicago North Shore & Milwaukee Railroad. The device is shown in the accompanying illustration.

When assembling motors, the outside caliper consisting of a $\frac{1}{4} \times 2$ -in. steel bar *A*, graduated in sixteenths of an inch, with integral leg *B*, adjustable leg *C* and stop slide *D*, is placed on the armature after bearings are assembled on the shaft. The fixed leg of the caliper is placed against one bearing collar at *H*. The sliding leg *C* is then placed against the opposite bearing collar at *I*, and locked in place by thumb screw *F*. Slide *D* is then moved to the left against leg *C*, and locked in position by thumb screw *G*. The distance between the bearing collars is then read in inches or fractions of an inch at point *E*. Slide *D* holds the reading after the caliper is removed from the armature.

The inside caliper, consisting of a $\frac{1}{4} \times 2$ -in. steel bar No. 1, two adjustable $\frac{1}{4} \times 1\frac{1}{2}$ -in. legs No. 2-2, sliding sleeve No. 3 with plate No. 9 and sliding rod No. 4 which is graduated in sixteenths of an inch, is placed in the motor shell as shown. Bar No. 1 is held against the bearing housing face on the shell, and No. 4 is forced down against the face of the bearing housing. Thumb screw No. 5 is then tightened, holding bars Nos. 1 and 4 together. This device is now removed, inverted and placed on the other bearing housing as in Fig. 3, which allows sliding sleeve No. 3 with its cross plate No. 9 to slip down and rest against the bearing shoulder on the head. Set screw No. 6 is now tightened. This adjustment subtracts the distance from the bearing shoulder and the face of the head. Upper end of sliding sleeve No. 3 now registers on rod No. 4 the distance between the bearing faces of the shell heads in inches or fractions of an inch that would exist when the motor is assembled. This reading compared with the reading

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

obtained on the gage, Fig. 1, shows clearance plus or minus.

Plate No. 8 fastened to bar No. 1 acts as a stop for key No. 7, which travels in a slot of sleeve No. 3. This arrangement permits rod No. 4 to be locked to bar No. 1, leaving sleeve No. 3 with cross piece No. 9 free to move without disturbing measurement taken. A slot is also provided on the opposite side of the sleeve to provide clearance for thumb screw No. 5.

This device can be used on any size motor by extending the graduations on rod 4 and bar "A" to fit the motor.

Brake Valve Handle Fastener*

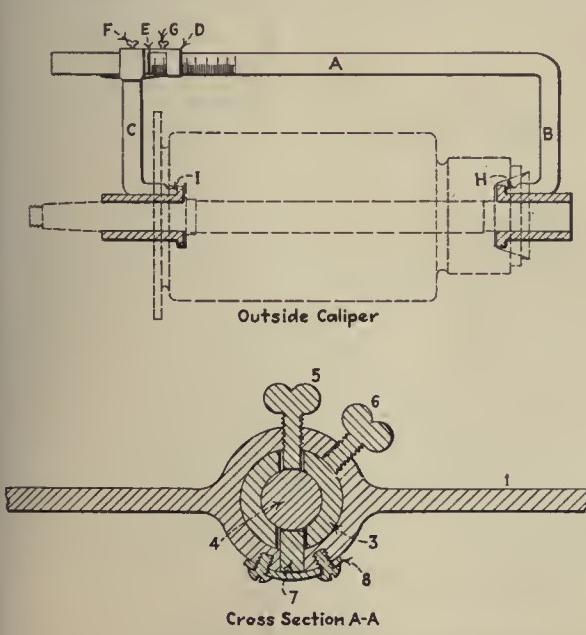
By A. R. PETRIE
Motorman
Toronto Transportation Commission



Accidental removal of the brake valve handle is prevented by clamping it to the rotary valve key

WHEN wear develops in the upper end of the rotary valve key or the bushing in the handle of the M-20 brake valve, it is possible under conditions with involuntary nerve reaction and excitement, that the brake valve handle in the lap position can be accidentally lifted from the valve. To avoid this possibility on cars of the Toronto Transportation Commission and to compensate for wear the clip illustrated was adopted.

The cap of the brake valve handle was reduced in height just slightly below the height of the rotary valve key, and a brass washer placed on top. An oil screw clamps the washer to the top of the rotary valve key, and effectively prevents the brake valve handle from being removed accidentally.



Armature caliper and housing caliper used by the North Shore Line to indicate accurately armature end play

Tread Guard Placed at Frog Joint*

By E. B. SPENZER
Special Work Engineer Cleveland Railway



Guard placed against outside curved rail to prevent derailments in sharp angle frogs

DERAILMENTS are frequently caused by sharp angle frogs, or involved frogs, the intersections of which are so close together that there is a long gap between the points, or by frogs in which both runs are curved in the same direction, necessitating a level guard due to the tread clearance.

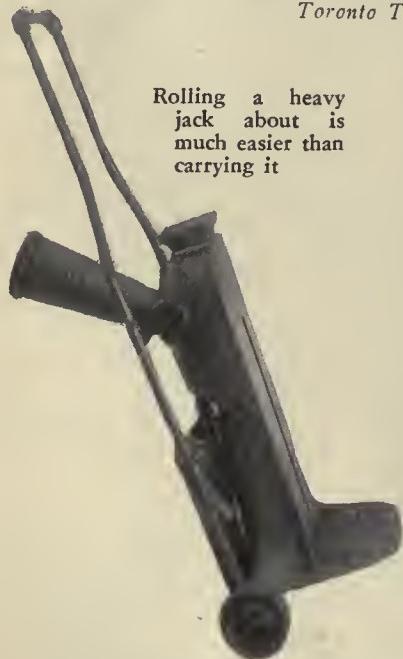
To prevent this trouble, the Cleveland Railway places a rail against the back of the outside curved rail, raised $\frac{3}{4}$ in. above the ball of the rail and spaced far enough away from the running rail gage to give the proper tread clearance. This rail is of sufficient length to guide the wheel before it reaches the gap of the level guard, and carries it past both points. It is beveled at both ends so as to receive the wheel after any gage wear has taken place.

In several instances these rails have been furnished by the manufacturer supplying special track work. Others have been installed by the company.

Jack Handling Truck*

By A. F. POLLARD

Carpenter
Toronto Transportation Commission



Rolling a heavy jack about is much easier than carrying it

diameter. Two cross members, $\frac{3}{8} \times \frac{1}{8}$ in., and a pan of $\frac{1}{8}$ -in. sheet steel are formed at the bottom to act as a

receptacle for the jack. This is a handy little device, and saves a lot of time and energy in moving this useful manual aid from place to place.

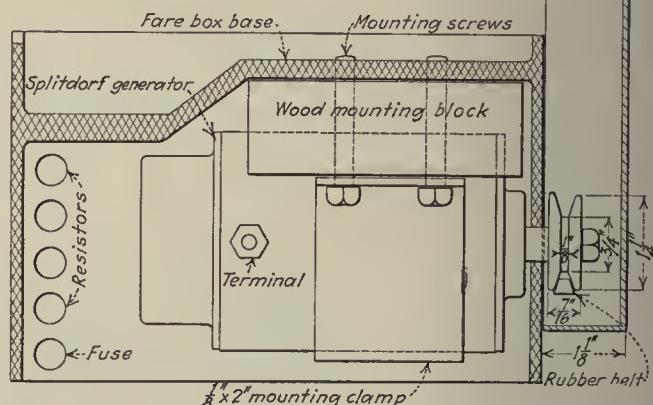
Electrically Driven Fare Box*

By CHARLES HERMS
General Foreman
San Diego Electric Railway

SATISFACTORY results have been obtained by driving Johnson fare boxes on buses with Splitdorf generators which have been used for motorcycle lighting at 6 volts. The generators are used as motors. The standard base for a National Pneumatic Company air-driven fare-box motor has been adopted in this arrangement; but in place of the four-cylinder air motor we have installed the above-mentioned generator. Some of these motors have been in service for eighteen months, and with the exception of an occasional belt break there have been no drive unit failures. This is a big improvement over the air motor we used formerly.

White petroleum jelly is packed into the bearing and seems to last indefinitely. The drive belt is cut

Splitdorf generators are used with 12-volt batteries to drive Johnson fare boxes on buses of the San Diego Electric Railway

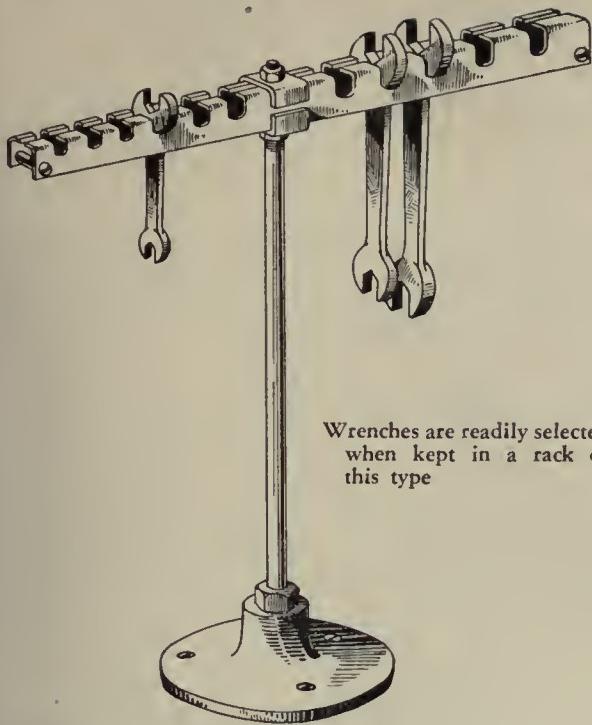


from a 36x6-in. heavy inner tube. The motor is driven by a 12-volt battery, and it is protected with a fuse mounted on the base of the fare box. A resistor is inserted in the battery circuit to reduce the voltage across the motor from 12 to 7.

The unit operates satisfactorily across the motor with a 12-volt battery because the voltage can be maintained above a minimum of 6 volts. The Splitdorf generator will operate satisfactorily with a 6-volt battery when it is fully charged. But as soon as the battery is partially discharged and the voltage drops, the motor becomes sluggish. As many of our buses are equipped with 6-volt batteries we are desirous of obtaining a motor that will operate satisfactorily with such batteries even when there is a reasonable drop below 6 volts.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Handy Wrench Rack



EVEN in well-managed shops the useful wrench is an elusive tool, especially when a workman needs it in a hurry. In these times of efficiency experts and time-saving devices, one is overcome with chagrin to see a man walking about the shop in search of a wrench when he should be using it. If the men are trained to place the tool in a suitable rack, conveniently located, waste time and motion will be eliminated. The illustrated rack consists of a stand and two pieces of $\frac{1}{8}$ -in. steel shaped as shown.

Automatic Block Signals Limit Freight Traffic Across Bridge*

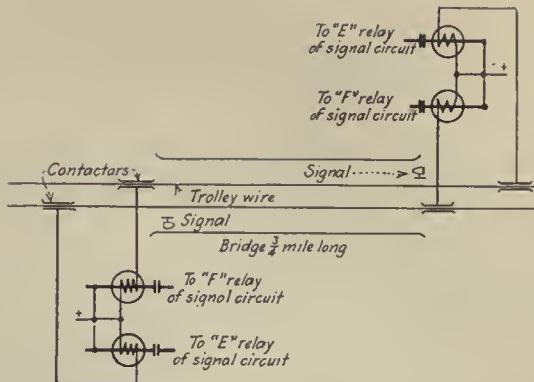
BY H. A. BROWN

*Return Circuit, Switch and Signal Division
Cleveland Railway*

BY AN order of the Board of County Commissioners, the Cleveland Railway is not permitted to operate more than one loaded interurban freight train at a time across any one of several specified county bridges. To control such movements and to eliminate bad traffic hazards Type CD Nachod block signals, operated by Cheatham Type 43 trolley contactors, are used in conjunction with external current relays. The contactor is a standard electric track switch unit for obtaining selective operation, and is used instead of the regular CD signal contactor which would cause the corresponding signal to function every time a car passed under it. No changes are necessary in the standard operating circuits.

Loaded freight trains set and clear the blocks by passing under the trolley contactors at either end of the bridge with power on. Passenger and empty freight cars, not required to operate the signals, pass under the trolley contactors with power off in order to prevent the

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



Selective trolley contactors set signals automatically when freight cars pass with power on

display of the red or stop indication. These automatic signals eliminate the necessity for trainmen to get off the cars and to walk to the curb, through heavy auto traffic, to set or clear the signals. Unnecessary traffic congestion and loss of time are also prevented by their use, because it is no longer necessary to stop trains in traffic to operate the signals.

Dipping Tank Saves Paint*

By W. R. MCRAE
*Superintendent of Rolling Stock and Shops
Toronto Transportation Commission*



A top layer of $\frac{1}{2}$ -in. of paint will do the job economically and satisfactory

and dipped in and out of the tank slowly, and then allowed to drain. This method saves much in material and time of drying in comparison with the method of having the tank full of paint.

PAINTING of H-B life-guard gates and carriers is done by an economical method in the shops of the Toronto Transportation Commission. A tank, sufficiently large to accommodate the carrier comfortably when suspended, was placed below a rail overhead, on which is hung a trolley and tackle for lifting and lowering the carriers. The tank is practically filled with water, and on the top is floated about $\frac{1}{2}$ in. of black enamel.

To coat the lifeguard, it is simply hoisted

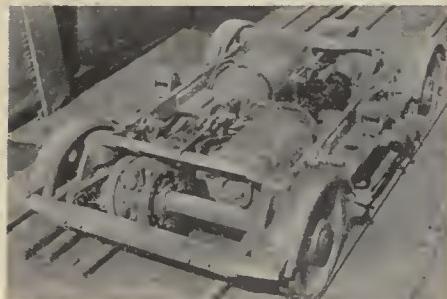
NEW PRODUCTS

for the Railways' Use

Worm Drive Truck Has 63 Per Cent On Springs

SPRING suspension of 63.3 per cent of the total weight, including motors, has been obtained in the 90-E truck for worm drive developed by the J. G. Brill Company. The weight of the truck complete with motors and drive is 7,060 lb., of which 4,470 lb. is spring borne.

Many fundamental features of Brill truck design are retained. These include solid forged side frames, longitudinal leaf springs, half-ball brake hangers with renewable wear caps and wheel tread shoe brakes. The axles are of heat-treated carbon



The Brill 90-E truck has a 6-ft. wheelbase and a top height of 2 ft. 8½ in.

vanadium steel fitted for inside journal bearings and a roller bearing worm drive assembly pressed directly on. The 24-in. diameter wheels are pressed on the ends of the axles. Four silencing blocks are bolted on each wheel.

To reduce the truck width and weight an inside frame was adopted. Journal boxes are of the compensating type with roller bearings. Friction wear is taken on large surfaced bushings and wear plates. This type of box eliminates the pedestals, and by its radial adjustment to load, maintains a constant brakeshoe clearance. The side frames have recessed heads over the boxes, forming journal box spring pockets, and end arms are extended beyond the journal box pivot pin, forming truck end-frame connections. The bolster contour permits necessary clearance for drive shafts and couplings, and for center plate mounting. The ends extend under

the side frame shaped for single roller-type side bearings. Longitudinal semi-elliptic leaf springs are suspended at their outer ends near the journal boxes by friction controlled swing links, permitting controlled side swing of the bolster when taking curves. The entire truck frame and the bolsters, spring suspension, motors and drives, are spring supported.

Power is obtained from two 50-hp. light-weight, high-speed motors, mounted longitudinally between the axles and bolsters. Each armature shaft is connected to the worm drive on the opposite axle through two universal couplings and a propeller shaft which acts only through the small angularity caused by the flexing of the journal box springs. The drive consists of a hardened-steel worm and bronze worm wheel with a 7.4 to 1 reduction, pressed directly on the axle and equipped with a roller-bearing mounted housing of the oil sealed drum type. Bearing adjustments are made through shims easily accessible.

Improved Gear Cases for Railway Motors

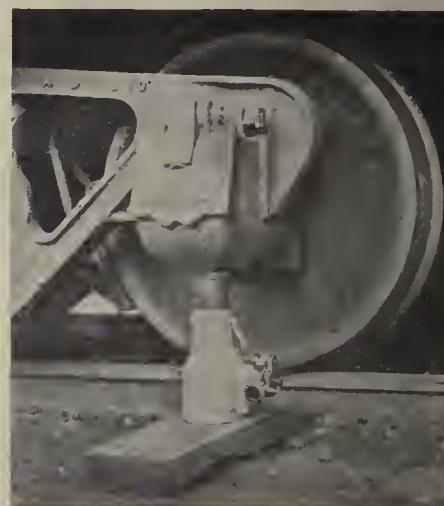
GEAR cases now supplied with General Electric GE-265 and GE-702 railway motors weigh three-fourths as much as the standard pressed steel and the light-weight malleable iron cases formerly used. The new cases are of standard sheet and rolled sections, with steel channels



Welded gear case for railway motors

forming the top and bottom. Except for rivets used to assemble the felt grease guards, all parts are either atomic-hydrogen or arc welded. The halves are assembled on jigs to assure interchangeability.

The joint between halves is such that the lubricant cannot leak and water, dirt and foreign substances cannot enter. In a tightness test the case was charged with grease thinned to the consistency of lubricating oil and the gearing was run at high speed in each direction for 33 hours. The case, painted white, showed that leakage, even under such conditions, was negligible.



This light-weight journal jack is available in capacities of 15 tons and 25 tons

Aluminum Journal Jack

USE of a heat-treated cast aluminum alloy housing has made possible a substantial reduction in weight in a journal jack just placed on the market by the Duff-Norton Manufacturing Company, Pittsburgh, in two sizes, one a 15-ton capacity and the other 25 tons. Both models are equipped with a positive stop safety feature to prevent disengagement of the lifting standards. The 25-ton jack weighs 26 lb., or approximately 1 lb. per ton of capacity. The smaller jack weighs 19 lb.

Since the aluminum alloy shell is resistant to atmospheric corrosion

and the steel mechanism within the shell is packed with grease, the jack is said to be practically immune to all weather conditions. The jacks were found in manufacturer's tests to have a safety factor of at least 25 per cent more than rated capacity.

Self-Lapping Brake Valves

FOUR types of self-lapping brake valves, for hand or foot operation, for straight air or semi-auto-

matic equipment, have been developed by the Westinghouse Traction Brake Company. The simplest is a hand-operated valve for straight air equipment sets and releases the brakes by means of the straight-air pipe. Another hand-operated valve for semi-automatic equipment, besides straight air application and release, will vent the emergency pipe for an emergency application. A third hand-operated valve includes all functions possessed by the semi-automatic type and also

has a sanding feature and provision for opening and closing the car doors. Selective door control can be added. The foot-operated valve for straight air equipment provides for automatic straight air applications and interruptions of the power circuit if the operator's foot is not kept firmly on the brake pedal. The self-lapping feature obviates movement of the handle to service position and back to lap, as with the usual form of valves, when making a brake application.

New Models of Buses Shown at the Convention



Small Capacity Bus Developed by the Twin Coach Corporation

Designed to meet the demand for a low-priced vehicle, this bus, with a seating capacity of 15 passengers, is now the smallest on the market. It is a single-engine design with a 132-in. wheelbase. It is equipped with the self-operated automatic clutch recently developed.



All-metal, 40-Passenger Bus Built by the General Motors Truck Company

A feature of this bus is its low weight per passenger. It has a 150-hp. engine mounted at the rear that is removable in a unit with the rear axle center. The short drive line is said to reduce power losses. An easy-acting steering mechanism has been incorporated in this vehicle.



Center-Exit Bus Built by the White Company

It has a seating capacity of 33 passengers and is equipped with a recently designed six-cylinder engine rated 130 hp. at 2,400 r.p.m. The bus has a large standee area at the front. The center door is operated by air treadles and is in full view of the operator.



Light-Weight 21-Passenger Fargo for City Service

Aluminum alloys have been used generously throughout the body of this new model, keeping the weight down to 12,000 lb. The engine has eight cylinders and develops 120 hp. The body is carefully insulated against heat and noise.



Large Capacity Bus of the Street Car Type Now in Production by Mack Trucks, Inc.

The one illustrated is rated as a 42-passenger bus, but various capacities are available depending on the seating arrangement and type of exit door used. The wheelbase is 196 in. and the engine is rated at 110 hp. Power steering with a hydraulic booster is a feature.



First Trolley Bus Design of the General Motors Truck Company

The features of this vehicle include rear mounting of the motors, a new centralized underbody control system, light alloy trolley poles, and a blower system for ventilating the controllers, motors and compressors. The seating capacity is 44.

Trend of REVENUES and EXPENSES

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Boston Elevated Railway, Boston, Mass.												
Sept., 1930....	2,470,918	3.78	2,091,718	0.52	50,868	200.31	72,267	11.61	63,549	5.42	8,497	436.09
Oct.....	2,811,399	4.04	2,157,474	1.29	221,188	31.30	75,708	17.80	66,353	0.59	18,447	226.80
Nov.....	2,579,899	10.34	2,066,206	2.66	71,150	77.85	72,024	13.82	66,314	0.23	21,171	158.25
Dec.....	2,850,330	8.80	2,178,896	2.24	235,950	58.62	79,764	15.78	67,438	7.38	13,133	236.77
Jan., 1931....	2,840,159	8.43	2,082,456	6.23	314,067	30.56	74,018	13.38	62,239	7.93	13,594	75.36
Feb.....	2,534,828	8.33	1,952,032	5.23	142,339	48.22	75,201	7.83	64,051	7.61	13,965	5.28
Mar.....	2,769,564	7.30	2,019,081	4.98	309,212	29.08	70,660	0.48	62,685	4.90	16,298	23.64
Apr.....	2,616,188	7.00	1,909,176	7.93	275,740	11.45	72,560	8.29	61,040	6.82	15,996	21.34
May.....	2,579,265	8.70	1,993,753	4.36	143,804	52.47	63,338	13.81	59,346	9.15	24,700	97.48
June.....	2,415,179	5.32	2,073,560	7.04	99,815	169.79	58,406	4.11	59,429	7.33	20,259	1.34
July.....	2,188,942	7.68	2,021,305	4.12	271,777	82.23	61,749	4.40	57,896	7.34	7,823	46.23
Aug.....	2,098,072	7.99	1,948,492	7.79	341,901	25.50	60,302	16.55	58,616	7.76	28,041	171.16
Sept.....	2,243,491	9.80	1,931,683	7.65	939,950	300.79						
Brooklyn-Manhattan Transit System, New York, N. Y.												
Sept., 1930....	4,834,251	2.49	3,453,431	4.52	667,323	6.20	42,823	16.49	28,052	14.83	84,893	144.43
Oct.....	5,036,775	2.58	3,572,553	4.20	758,817	2.78	38,032	11.56	27,266	6.85		
Nov.....	4,769,083	1.37	3,366,923	6.98	689,470	2.34	36,974	12.49	44,183	9.58	93,685	127.12
Dec.....	5,065,484	2.56	3,546,963	4.25	814,788	2.04	36,166	15.00	27,949	1.79	99,343	112.93
Jan., 1931....	4,852,706	6.48	3,475,330	7.01	674,029	5.80	33,291	20.15	25,057	9.18	105,000	110.59
Feb.....	4,453,655	3.79	3,159,903	5.96	583,468	2.40	32,281	19.80	22,990	9.61	111,369	110.17
Mar.....	5,028,562	2.66	3,475,847	3.37	814,360	4.13	32,904	22.38	24,732	14.69	114,459	93.49
Apr.....	4,969,481	2.09	3,458,940	3.35	804,235	0.25	34,729	15.98	24,132	11.98	117,394	189.69
May.....	5,056,779	3.31	3,438,037	4.51	913,877	1.64	39,889	12.63	24,992	11.61	116,770	57.67
June.....	4,983,112	1.71	3,466,384	8.49	870,919	12.12	41,484	11.97	25,961	11.24	116,819	49.84
July.....	4,841,635	3.24	3,499,609	3.02	631,791	7.21						
Aug.....	4,582,572	3.87	3,419,932	3.90	423,123	9.03						
Sept.....	4,693,503	2.91	3,366,543	2.51	597,074	15.27						
Brooklyn & Queens Transit System, New York, N. Y.												
Sept., 1930....	1,887,499	4.66	1,564,271	6.65	213,728	2.66	251,919	9.00	175,905	10.42	571,857	5.84
Oct.....	1,922,388	6.20	1,597,166	6.60	214,924	7.74	267,306	7.57	181,499	10.67	573,425	4.16
Nov.....	1,820,498	5.65	1,522,735	7.58	187,822	5.20	247,210	10.00	176,739	1.96	550,635	9.55
Dec.....	1,920,463	4.40	1,560,950	6.11	250,893	6.06	258,219	9.84	180,678	0.68	524,458	16.64
Jan., 1931....	1,849,644	6.18	1,541,235	7.58	197,355	3.02	242,554	10.52	176,792	11.08	518,843	17.70
Feb.....	1,704,677	3.98	1,416,192	6.40	176,217	2.58	223,256	14.11	163,249	12.96	507,328	60.19
Mar.....	1,941,078	1.98	1,602,862	2.56	227,472	1.21	244,396	10.97	170,067	12.70	502,405	19.39
Apr.....	1,911,878	1.29	1,592,919	3.11	208,514	6.86						
May.....	1,980,118	2.50	1,585,293	1.85	286,334	7.89						
June.....	1,942,830	1.29	1,609,335	0.34	221,493	13.98						
July.....	1,893,414	1.24	1,550,897	3.34	227,012	11.59						
Aug.....	1,849,792	1.23	1,574,167	1.32	142,067	17.54						
Sept.....	1,930,047	2.25	1,583,777	1.25	219,515	2.70						
Capital Traction Company, Washington, D. C.												
Sept., 1930....	327,713	7.06	268,066	1.61	30,259	6.78	974,433	2.80	506,845	0.23	132,332	18.68
Oct.....	374,646	1.22	288,351	1.48	58,638	17.56	1,033,584	4.33	521,325	1.97	176,999	17.79
Nov.....	346,054	2.70	273,481	1.54	42,659	11.05	994,735	6.18	489,761	4.08	169,455	21.42
Dec.....	369,885	1.77	274,221	3.21	67,651	0.61	1,060,614	4.66	419,109	17.40	306,321	12.49
Jan., 1931....	347,491	3.06	280,514	3.30	37,705	5.11	1,005,022	7.62	512,350	7.23	157,098	21.78
Feb.....	312,815	3.47	252,080	6.68	30,521	1.87	936,542	6.67	467,137	6.09	134,717	16.34
Mar.....	344,191	2.65	270,962	3.86	43,847	4.05	1,013,577	6.05	497,695	6.34	180,554	15.15
Apr.....	366,276	2.39	273,436	6.89	65,123	12.93	1,002,265	5.78	485,938	5.73	181,182	15.09
May.....	362,502	1.87	281,344	1.61	50,959	6.60	974,737	6.24	481,504	5.63	158,191	18.77
June.....	351,017	3.05	276,751	1.84	45,841	12.14	941,598	4.82	477,392	4.41	128,896	16.83
July.....	306,826	0.10	258,341	1.62	9,438	91.25	897,211	6.00	470,918	6.28	91,288	21.80
Aug.....	264,135	16.02	251,657	6.29	17,408	208.00	875,376	6.29	463,292	7.31	77,020	22.18
Sept.....	276,418	15.65	236,952	11.61	9,452	69.76	897,981	7.73	454,556	10.82	106,624	17.91
Chicago Surface Lines, Chicago, Ill.												
Sept., 1930....	4,568,564	9.50	3,789,472	4.40	713,323	12.94	654,477	6.26	454,818	9.66	160,897	14.62
Oct.....	4,879,570	10.79	3,933,416	7.35	799,118	11.69	691,672	2.54	506,107	2.41	148,701	11.61
Nov.....	4,537,647	13.48	3,769,538	6.86	712,177	20.77	542,672	11.02	430,907	6.24	80,529	23.11
Dec.....	4,846,000	8.09	3,984,572	9.89	767,348	16.87	577,425	13.69	421,987	14.26	127,588	5.66
Jan., 1931....	4,576,133	12.65	3,825,964	5.37	718,129	21.00	509,641	20.77	395,953	19.80	87,742	9.83
Feb.....	4,234,704	10.90	3,665,038	6.04	601,726	15.44	498,067	5.89	388,126	3.81	84,381	2.26
Mar.....	4,584,224	4.35	4,287,237	5.34	557,167	15.05	568,653	1.95	398,855	5.94	143,225	28.98
Apr.....	4,759,624	4.48	4,092,047	0.36	675,629	11.66	547,992	7.17	395,315	6.46	127,179	3.81
May.....	4,541,847	9.38	3,802,582	4.61	724,514	19.88	581,953	4.34	389,538	8.87	162,905	13.83
June.....	4,348,896	8.76	3,629,943	6.36	664,122	14.51	581,093	1.58	398,980	15.29	154,417	90.05
July.....	4,093,702	9.74	3,579,566	5.98	580,118	10.55	550,906	8.41	395,741	16.33	123,420	40.89
Aug.....	4,018,958	10.45	3,502,795	7.74	589,056	10.34	597,050	9.75	403,603	13.54	156,770	2.58
Sept.....	4,061,261	11.14	3,307,020	12.73	684,161	4.88						
Department of Street Railways, Detroit, Mich.												
Sept., 1930....	1,510,161	26.36	1,436,175	12.59	51,711	115.40	5,684,267	0.17	3,983,368	7.78	131,270	206.66
Oct.....	1,579,476	25.84	1,458,238	14.91	22,933	91.71	6,315,679	1.13	4,162,660	0.83	161,417	207.14
Nov.....	1,481,136	23.35	1,333,571	13.38	4,890	98.14	5,965,365	4.96	3,869,340	0.00	272,021	121.79
Dec.....	1,610,179	22.59	1,440,503	21.87	20,052	77.93	6,477,864	0.82	4,194,315	3.96	293,152	47.40
Jan., 1931....	1,550,656	28.84	1,421,575	20.95	12,759	91.44	6,123,645	4.42	4,538,833	10.83	348,972	68.92
Feb.....	1,431,468	25.58	1,323,683	18.96	28,309	117.91	5,570,354	3.27	3,653,798	2.10	521,587	10.36
Mar.....	1,696,308	16.88	1,415,021	18.68	133,347	11.03	6,293,013	2.24	3,973,704	4.61	212,641	6.65
Apr.....	1,605,536	19.51	1,368,187	20.82	101,041	27.10	6,127,713	2.38	3,993,181	2.83	189,134	17.33
May.....												

Trend of Revenues and Expenses by Months (*Concluded*)

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*		Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Kansas City Public Service Company, Kansas City, Mo.													
Sept., 1930...	650,114	9.99	524,324	12.12	50,261	1.32							
Oct.	725,428	4.89	700,311	12.90	60,485	19.35							
Nov.	706,577	5.29	572,066	7.04	58,994	5.69							
Dec.	758,045	1.73	570,065	14.68	108,444	284.88							
Jan., 1931...	711,215	6.52	577,741	12.67	61,108	137.10							
Feb.	640,676	6.87	537,583	9.72	27,392	149.06							
Mar.	216,637	2.58	577,319	7.25	66,013	72.81							
Apr.	709,515	0.68	565,328	6.23	71,298	99.32							
May.	701,286	2.37	562,482	7.66	64,474	114.33							
June.	655,957	0.17	540,187	8.23	42,677	683.20							
July.	613,628	3.19	533,084	9.23	6,643	119.18							
Aug.	600,311	3.57	518,559	2.18	6,122	247.05							
Sept.	603,215	7.21	523,601	0.14	6,303	87.06							
Long Island Railroad, New York, N. Y.													
Sept., 1930...	3,589,671	7.33	2,467,056	7.07	928,655	6.58							
Oct.	3,371,761	6.80	2,446,346	8.97	729,067	1.77							
Nov.	2,954,624	4.20	2,249,258	14.56	483,180	89.15							
Dec.	2,905,045	6.60	2,130,182	18.27	596,812	47.11							
Jan., 1931...	2,763,421	6.65	2,210,263	9.65	321,141	8.00							
Feb.	2,561,169	7.43	2,074,216	9.13	332,002	3.88							
Mar.	2,841,915	3.09	2,234,418	9.00	449,501	24.64							
Apr.	2,976,402	4.69	2,269,029	7.37	533,425	1.97							
May.	3,212,765	4.00	2,338,313	8.03	695,032	9.93							
June.	3,414,354	6.78	2,351,016	7.26	907,010	5.76							
July.	3,629,561	9.69	2,594,463	2.75	783,315	32.75							
Aug.	3,513,473	11.48	2,504,287	5.04	781,691	32.08							
Sept.	3,167,769	11.75	.....	.....	.....	.....			
Market Street Railway, San Francisco, Cal.													
Sept., 1930...	745,298	5.35	626,770	3.74	64,731	16.38							
Oct.	786,012	6.73	675,908	6.49	52,384	45.58							
Nov.	729,407	8.81	615,613	8.18	60,457	29.25							
Dec.	775,508	6.12	639,249	6.52	83,460	0.03							
Jan., 1931...	738,092	6.55	641,519	4.83	45,011	12.31							
Feb.	668,931	8.17	576,661	8.22	41,002	7.29							
Mar.	757,960	6.40	633,346	6.81	72,828	0.05							
Apr.	745,252	6.78	620,106	7.06	73,837	3.48							
May.	733,105	7.50	619,934	8.21	62,805	2.08							
June.	704,769	5.19	654,225	1.75	37,384	11.82							
July.	700,996	4.68	598,082	7.97	52,186	60.40							
Aug.	726,480	5.69	607,925	5.50	68,175	6.51							
Sept.	700,563	6.00	581,479	7.23	68,712	6.15							
New York, Westchester & Boston Railway, New York, N. Y.													
Sept., 1930 ...	203,617	8.18	165,256	6.57	192,861	29.53							
Oct.	202,046	7.58	138,192	14.09	190,748	20.81							
Nov.	184,690	8.74	170,542	2.52	216,451	19.75							
Dec.	190,136	12.31	138,592	17.80	205,029	16.75							
Jan., 1931...	182,249	13.76	160,800	9.44	280,394	32.37							
Feb.	161,311	15.02	149,571	11.18	222,308	29.42							
Mar.	181,729	12.80	144,442	3.54	195,802	24.31							
Apr.	186,708	13.03	142,832	0.31	189,142	19.00							
May.	195,905	15.11	149,268	0.42	186,589	25.70							
June.	193,820	14.62	142,600	3.45	183,007	23.70							
July.	195,461	12.92	146,820	0.40	188,581	23.65							
Aug.	180,965	8.79	142,111	6.62	197,099	6.55							
Sept.	181,828	10.70	137,940	16.53	191,542	0.68							
Northwestern Pacific Railroad, Sausalito, Cal.													
Sept., 1930...	548,282	8.68	471,657	3.78	16,471	83.57							
Oct.	555,867	18.49	534,858	4.44	7,447	95.22							
Nov.	333,193	27.74	421,717	18.33	97,567	120.85							
Dec.	312,319	20.77	465,220	3.46	156,491	74.63							
Jan., 1931...	283,852	21.78	401,656	14.41	123,928	14.76							
Feb.	273,818	27.40	387,512	12.96	122,531	68.87							
Mar.	308,466	24.17	408,068	14.43	109,855	48.81							
Apr.	322,742	25.66	402,400	16.55	88,300	59.51							
May.	346,743	28.51	362,722	24.85	28,886	93.64							
June.	380,604	24.50	368,559	17.82	1,970	95.39							
July.	479,098	19.97	354,413	9.69	110,013	43.64							
Aug.	464,342	27.27	368,885	11.22	82,947	65.23							
Sept.	.....	.....	.....	.....	.....	.....	
Staten Island Rapid Transit Company, New York, N. Y.													
Sept., 1930...	206,908	15.93	165,525	4.87	26,127	60.73							
Oct.	205,631	10.68	167,586	6.49	29,723	26.11							
Nov.	178,652	17.42	161,608	0.58	10,788	80.37							
Dec.	178,474	9.08	160,715	47.29	5,997	92.23							
Jan., 1931...	170,387	9.58	158,982	8.35	1,448	114.6							
Feb.	161,415	13.58	142,565	9.20	2,151	93.49							
Mar.	173,723	7.98	159,035	7.78	1,164	81.24							
Apr.	176,863	10.76	147,210	13.23	23,169	31.91							
May.	188,151	11.61	163,148	7.61	9,268	63.19							
June.	204,452	9.12	150,345	16.01	39,203	0.38							
July.	202,230	17.11	163,479	13.58	25,402	38.08							
Aug.	197,386	15.42	159,702	5.00	23,973	51.66							
Sept.	.....	.....	.....	.....	.....	.....	
Third Avenue Railway System, New York, N. Y.													
Sept., 1930...	1,428,136	3.48	1,167,528	8.36	45,636	277.91							
Oct.	1,456,688	4.03	1,205,455	9.73	36,257	317.06							
Nov.	1,373,335	6.37	1,146,168	10.17	12,079	130.15							
Dec.	1,438,752	3.49	1,197,249	8.61	26,250	186.44							
Jan., 1931...	1,393,054	5.10	1,178,797	9.14	1,694	96.33							
Feb.	1,274,832	4.27	1,070,307	8.56	11,143	126.49							
Mar.	1,418,429	3.38	1,174,984	6.88	27,364	430.88							
Apr.	1,408,235	3.85	1,155,880	5.98	44,331	250.25							
May.	1,464,031	4.29	1,072,584	7.70	76,972	32.40							
June.	1,440,848	2.88	1,145,871	6.19	79,746	76.91							
July.	1,394,973	2.43	1,140,036	5.98	41,829	1,924.08							
Aug.	1,302,353	3.53	1,087,507	7.90	1,067	129.27							
Sept.	1,328,192	7.00	1,070,866	8.28	46,099	1.01							
United Electric Railways, Providence, R. I.													
Sept., 1930...	493,296	12.72	434,036	10.39	8,376	72.01							
Oct.	531,803	13.78	439,930	12.83	41,223	53.80							
Nov.	506,318	14.58	439,930	12.83	16,958	54.37							

NEWS of the Industry

Improvement Projects

Chicago, Ill.—Workmen have started the construction of the Chicago Surface Lines extension of the North Avenue street car line. The present tracks will be extended from North Austin Boulevard to Narragansett Avenue. The work would be pushed rapidly in order to have all of the concrete laid before freezing weather.

Seattle, Wash.—The Municipal Street Railway will erect a steel girder span to replace the present wood span on the elevated bridge across the newly paved section of East Marginal Way, at a cost of \$6,000. The work will be financed by municipal railway funds.

Fort Wayne, Ind.—The maintenance of way department for the Indiana Service Corporation's local city railway completed the laying of 3,955 ft. of double trackage and pavement on Nov. 1 on Calhoun Street, Fort Wayne's main traffic artery. In the meantime, the operating department maintained its schedule uninterruptedly, moving 1,580 cars daily over the sector under construction. The project was begun on Aug. 3, and completed at a cost of \$100,000. The new 102-lb. rails are ballasted with concrete. Granite paving blocks were used at all intersections. Crews worked night and day to complete the job.

Hammond, Ind.—A. C. Colby, new general manager of the recently-organized Chicago & Calumet District Transit Company, serving Hammond, East Chicago and Whiting, Ind., will immediately undertake a traffic survey to determine the railway and the bus needs of the territory as a guide to the rehabilitation of transportation facilities. Urgent track repair work will be started on the lines at once and as many of the cars as can be spared are to be sent to the shops immediately for renovation, but the major program of reconstruction work will not start until next spring.

Fare Changes

Youngstown, Ohio—The Youngstown Municipal Railway reduced the price of weekly passes on its lines from \$1.25 to \$1, effective with the passes used in the week of Oct. 18. With a total of 6,813 \$1 weekly passes sold in one week, A. W. Hartford, local street railway commissioner, expressed pleasure of the first week's trial. The 6,813 pass sale figure compares with an average of 3,300 \$1.25 passes sold during the last few weeks.

(Continued on Page 660)

New England Meeting

Stirred by Mr. Dana's Talk

Experimentation based on the firm foundation of facts, not opinions, will help to solve the problems of the electric railways. This was the gist of Edward Dana's talk at the dinner of the New England Street Railway Club on Oct. 29. He said experimentation is sound if based on facts. The work of the Presidents' Conference Committee was cited as a significant step in this direction, although belated, adding that the present depression intensified the need for experimentation, called for hard work, and emphasized the need for more efficiency.

Mr. Dana deplored the tendency of the industry to think of the problems of the mass transportation area, the small city and the interurban lines as being alike. The problems of these three branches differ greatly. They should be studied separately.

There are two ways by which railways can better their positions: by greater operating economy and by the production of more revenue. Greater operating economy can be accomplished by co-operation of management and men. Much can be done and should be done in getting more revenue. Not everybody wants the same kind of transportation. The industry was on an unsound economic foundation with a flat

5-cent fare. Mr. Dana said the industry has been remiss in not trying more fare experiments. It is now feeling its way in co-ordinated transportation.

Mr. Dana's talk was followed by a display of the film showing the work of the car research committee.

Thomas Carens, assistant to the president of the New England Power Association and former Washington correspondent for the Boston *Herald*, talked on happenings in Washington. He gave an amusing account of personalities in Congress.

John Dean analyzed the pull-in records of the southern properties at the afternoon meeting, showing by charts the records of pull-ins and of maintenance costs of member companies. He said the adoption of a uniform classification and the submission of records to that association had done much to improve service and lower maintenance cost by fostering competition. He urged the New England club to adopt a similar plan.

Seattle Recommendations Expected Soon

Mayor Robert Harlin's street railway commission is preparing a report embodying its recommendations about Seattle's Municipal Railway system. The commission, it is expected, will recommend a program for reorganization of the railway system, also policies for its operation and management, and other changes that will require either State law or city charter amendments. Chairman Maxwell states he is not prepared to divulge the recommendations in advance of final action by the commission, but he did say that the commission has not given definite consideration to the various candidates for general manager of the railway system. He said:

"We have just confined ourselves to a survey to determine the kind of a man we want for this job."

City-Owned Bus System Not Authorized

G. E. McCrossan, K. C., corporation counsel for the city of Vancouver, B. C., has informed the Civic Finance Committee of that city that civic authorities have no legal power under the present charter to operate a city-owned bus service in competition with the British Columbia Electric Railway. Alderman will consider an amendment of the charter to include such powers. Several years ago the Provincial Legislature refused to amend the charter along the lines suggested.

Accounting Conference Called by Wisconsin Commission

Electric utilities in Wisconsin have been requested to send representatives to a hearing before the Public Service Commission to study proposed revision of the uniform classification of accounts prescribed for electric utilities having gross operating revenues in excess of \$250,000 a year, to be held at Madison on Nov. 2, 3 and 4. The new rules are to be made effective on Jan. 1, 1932.

The classification now in effect was adopted in 1922 and is substantially identical with the accounting classification recommended by the National Association of Railroad and Utilities Commissioners. Commissioner Lilienthal said:

The key to genuinely effective and expeditious regulation is a classification of accounts which adequately reveals all the essential facts upon which regulation must be based. Judged by this test, we concluded some months ago that the existing classification falls short in a number of essentials.

The proposed new classification contemplates that if an electric utility is engaged in rendering one or more other utility services it shall keep for all of its utility services the same classification of balance sheet, income surplus, general fixed capital undistributed, and overhead construction cost, and general administrative expense accounts for all departments, and the instructions and definitions pertaining to each of these groups of accounts as prescribed for the electric department, are to apply to all classes of utility services whether electric street railway, gas, water, etc.

In view of the fact that the subject of accounting for utilities is one in which there is interest beyond the boundaries of Wisconsin, ideas and suggestions are invited from interested parties wherever located.

Commission Reports on Adequacy of Columbia Service

In eight of the ten cities visited by the board of engineers, appointed under authority from the South Carolina Supreme Court, to conduct an investigation into street railway and bus transportation, particularly as it relates to the city of Columbia, S. C., the board found the local transportation systems in the process of transition. Among the cities visited by the board were Raleigh, Durham, Danville, Lynchburg, Richmond, Petersburg, Augusta, Athens, Atlanta and Macon.

The board concludes that there is no reason why the modern bus cannot give as reliable service as the street car and afford equally rapid and comfortable riding for passengers under traffic conditions as they are in Columbia. Routes can easily be extended or altered and the passenger is taken on and put off at the curb.

The board also discusses the trolley bus, saying that except for the saving effected by the use of electric current, the board "can see no advantage that the trolley bus has over the gas bus." However, should the court find that the bus service furnished was unsatisfactory and order street cars restored, "it probably would be found advisable to use trolley buses."

The board says it considers it would be an economic loss to require the Columbia Railway, Gas & Electric Company to operate the fair grounds line on a regular schedule, but the "track should be kept in good condition and cars operated on special

occasions and when required by the Railroad Commission and the City Council."

W. S. Tomlinson and Walter E. Rowe, two members of the board, signed a report to the effect that they thought the railway had complied with all the orders of the board relating to cars and is now using a type of car which "renders adequate and satisfactory service."

G. E. Shand, the other member of the board, said he could not agree that the one-man cars now being used are acceptable, and cannot agree that they fulfill the orders of the court which required that the system be equipped with "comfortable up-to-date cars." The cars in use in Columbia, he said, were installed about 1922. The buses in use, he says, are modern and the trolley cars compare unfavorably with the buses.

Is the Taxi a Public Utility?

The questions of whether a taxi is a public utility and whether the number to be licensed can be determined on the basis of "public convenience and necessity" are expected to be raised in a suit if the Cincinnati City Council approves the report of its utilities committee, sustaining Utilities Director Gilman in denying ten additional taxicab licenses to the Parkway Cab Company.

Attorneys representing the Parkway Cab Company say that if City Council approves the report they will apply to the Court of Appeals for a writ of mandamus to compel city authorities to issue the additional licenses.

Chairman Pollak of the utilities committee of the Council insisted that the taxicab, if a public utility, must be considered in relation to all local means of transportation. He said that the question of taxi fares should be discussed. This would involve consideration of both a maximum and minimum fare, or a classification of service as to rate of fare and quality of equipment, he said.

New Working Agreement Plea in Indianapolis

Failing to secure an eight-hour working day, a seven-day week agreement for all employees with time and a half for overtime by petitioning the Public Service Commission, employees of the Indianapolis Street Railway have taken their requests

to James P. Trenton, company superintendent.

The original petition laid before the commission was dismissed on the grounds that the matter should first be taken up with the company, and failing an agreement, referred to the commission for consideration. The new petition asks recognition for the right to collective bargaining.

Baltimore's Mixed Chorus

Back in 1920, a male chorus, recruited from the ranks of the platform men, was organized under the patronage of the management of the United Railways & Electric Company, Baltimore. From the large number of men who presented themselves for a test, eighteen were selected and rehearsals started. Six months after the first rehearsals the chorus arrived at that state of proficiency that warranted its public appearances. Ever since then the chorus has been giving concerts before civic bodies and improvement associations and at club functions, banquets, and other functions.

The success of the male chorus aroused the women employees of the company to petition the management to sanction the organization of a chorus among them. To this the management readily assented, and the Ladies' Choral Club was formed with some 30 voices.

This chorus was successful from the very beginning and has appeared frequently before church bodies, business organizations and over the radio. The members of the Ladies' Choral Club are all in the general offices of the company.

For a while the activities of the male chorus and the choral club were entirely individual, and the success of each prompted the idea of combining them and giving joint concerts, a portion of the program being given by each section, and the latter portion by the ensemble. The male chorus was augmented to give proper tonal balance. The choruses still rehearse separately once a week, but hold a general rehearsal monthly in quarters provided by the company.

Shortly after the Christmas holidays each year a formal concert is given in one of the large auditoriums in Baltimore to which the public is invited free.

A dance orchestra assembled within the past year has been of great value in providing music for dances following concerts by the choruses when dancing was part of the program.



Baltimore company's mixed chorus in public demand

Fare Changes

(Continued from Page 658)

Cleveland, Ohio.—Approved by directors of the Cleveland Railway, a 5-cent experimental rate is in effect on the Superior, Payne and Wade Park lines between the Public Square and East 21st Street. Moreover, a proposal to sell passes good on cars during off-peak hours is being considered. Revenue under the recently adopted plan of 10 cents cash, four tickets for 30 cents, still shows a decrease over the comparable period last year.

Indianapolis, Ind.—A special excursion fare offering a round trip for one-and-a-half times the regular one-way fare was placed in effect on all lines of the Indiana Railroad System during the Indiana State Teachers' Association meeting here, Oct. 22, 23 and 24. Extra cars were placed in service on a number of regular runs. New high-speed cars, recently purchased by the system, were successfully operated in two and three-car units.

Trenton, N. J.—Application has been filed with the Board of Public Utility Commissioners by the Reading Company for an increase in trolley fare for passengers who use the Trenton-Princeton Traction Company's line within the local city limits. The present rate of fare is 3 cents. The company would charge 8 cents. For many years, residents of Trenton have been using the Princeton line's trolleys to ride within the city limits. The Trenton Transit Company maintains an 8-cent fare.

Indianapolis, Ind.—Representatives of local civic clubs have asked the Board of Public Works to reduce city bus fares from 10 cents to the 6½-cent level in force on street cars. The buses are operated by the People's Motor Coach Company, affiliated with the Indianapolis Street Railway.

Bus Operations

St. Louis, Mo.—The Public Service Commission will conduct a hearing here on Nov. 9 on the application of the St. Louis Public Service Company to substitute service by bus on its Jefferson Barracks rail line and on a part of its Natural Bridge line between Grand Boulevard and Kingshighway.

Binghamton, N. Y.—The Triple Cities Traction Corporation, operating both bus and railway service in Binghamton, Endicott and Johnson City, plans to substitute service by bus for the rest of its trolley lines in the three cities not later than May, 1932. To this end, the company has applied to the Public Service Commission for permission to make the change. The substitution program will require the purchase of approximately 60 bus units to replace the 34 trolley cars now in use. The company plans a large garage and service station on its property in State Street. The cost of the change is estimated at \$800,000.

Change of Address

ELECTRIC RAILWAY JOURNAL and other McGraw-Hill publications are now located in the new building at 330 West 42d Street, New York, built to bring all the operations of the company in New York together in one place. It will facilitate the affairs of the JOURNAL, of the McGraw-Hill Publishing Company, Inc., and of those who have occasion to address the JOURNAL if prompt note is made of the change of address. There has been no change in the telephone address. It remains: Medallion 3-0700.

Princeton, W. Va.—Officials of the Tri-City Traction Company plan to apply for permission to operate buses between Princeton and Bluefield to replace railway service.

Brooklyn, N. Y.—The Brooklyn Bus Corporation, affiliated with the Brooklyn-Manhattan Transit Corporation, has placed in service two more bus routes of the twenty routes included in its franchise contract with the city of New York. The two new lines are: Route No. 9, Staten Island Ferry-3rd Avenue-60th Street; Route No. 16, Fort Hamilton Parkway.

St. Louis, Mo.—The State Public Service Commission has denied the application of the Ferguson-Wellston Bus Company for a certificate to operate a bus line between Ferguson and Florissant in St. Louis County. The commission held that, under the State bus act, it has no authority over bus lines operated within municipal confines or in suburban territory. The commission has already authorized the St. Louis Public Service Company to substitute service by bus for rail service on its Florissant line north of the Wabash Railroad tracks, a distance of about 3 miles.

Columbia, S. C.—Buses of the Columbia Railway, Gas & Electric Company carried 348,925 passengers during the past three months while street cars carried 257,587, the Supreme Court was told on Oct. 15 by engineers who conducted a survey of the transportation situation here in connection with the plan looking toward a complete readjustment.

Service Changes

Winston-Salem, N. C.—The Aldermen will be asked by the Southern Public Utilities Company for permission to operate an experimental bus in Buena Vista and place its street cars on twenty-minute schedules throughout the day except during the rush periods, when a ten-minute schedule will be maintained.

Los Angeles, Cal.—The Pacific Electric Railway has asked the Railroad Commission for authority to reroute its Los Angeles-Hollywood-Venice line on week days into the subway terminal via

Glendale Boulevard and the subway instead of via Sunset Boulevard and Hill Street. The routing on Sundays is to remain as at present. The proposed change will result in better operating conditions and will permit a proper coordination of the present Hollywood Boulevard local service with the through line. Except on Sundays traffic on the line is light between points east of Glendale Boulevard and points west of West Hollywood.

Sandusky, Ohio—The Lake Shore Coach Company, controlled by the Lake Shore Electric Railway, has asked the Ohio Public Utilities Commission for permission to abandon its Amherst-South Amherst line, temporarily suspend service on its Lorain-Sandusky route and extend its Cleveland line to Sandusky, via Lorain and Amherst. The hearing has been scheduled for Nov. 20.

Philadelphia, Pa.—According to the Philadelphia *Ledger*, the franchise rights of the underlying company of the Philadelphia Rapid Transit Company, traffic difficulties, the objections of Ridge Avenue business interests, the cost to the P. R. T., all stand in the way of making the stretch of Ridge Avenue between Ninth and Broad Streets an unobstructed outlet for traffic from the Delaware River Bridge. In short, so many technical and financial factors stand in the way, that it now seems to be inevitable that the surface tracks will have to go back on Ridge Avenue when the subway construction work now under way is completed. The plan was to divert surface cars away from this thoroughfare.

Financial News

Indianapolis, Ind.—The Indianapolis & Southeastern Railway, operating lines from Indianapolis to Connersville and Greensburg, has petitioned the Public Service Commission for permission to abandon interurban service on the two lines. In the meantime, a Chicago creditor sought the appointment of a receiver to protect an unpaid claim. In filing its petition for abandonment the company stated that its lines earned only \$2,300 in 1930, and lost more than \$14,000 in the first seven months of 1931.

Cincinnati, Ohio.—Figures on the cost of Cincinnati's never-used rapid transit system, not previously made public, were revealed at a meeting of Federated Civic Associations by Henry Urner, auditor, on Oct. 27. Total cost to the taxpayers, according to Mr. Urner, on the "hole in the ground" as it now is, will be \$19,001,200. A way is being sought to utilize the transit system in its present uncompleted form. It is estimated that \$12,000,000 to \$18,000,000 additional would be required to develop the system to make it usable. Officials of the Cincinnati Street Railway are understood to take the stand that the system even if tied in with its lines could not be made to pay a fair return on so huge an investment.

(Continued on Page 662)

Pass Authorized for Bus Use

In the matter of the application of the Washington Rapid Transit Company, requesting authority to issue and sell two classes of weekly passes, good for transportation on its various lines within the District of Columbia, the Public Utilities Commission has ordered:

1. That the Washington Rapid Transit Company is hereby authorized to put into effect weekly rates for transportation on all of its lines operated within the District of Columbia. The rates are as follows:

- (a) Weekly pass good for transportation of bearer on the lines of this company within the District of Columbia at all times during the week for which issued (from beginning of service Sunday morning to close of service Saturday night), to be sold for \$1.25. (Not redeemable.)

(b) Weekly "Shopper-Theater" pass good for transportation of bearer on the lines of this company within the District of Columbia during the week for which issued (from beginning of service Sunday morning to close of service Saturday night) when boarding the bus during the following hours: Week days, 9 a.m. to 4 p.m., and after 6:30 p.m.; Saturdays, after 9 a.m.; Sundays, at anytime. This weekly pass to be sold for 75 cents. (Not redeemable.)

2. That these weekly passes be sold on buses and at other places to be designated by the operating company.

The commission approved these reduced fares effective Oct. 18, 1931, to remain in force for an experimental period of eleven weeks, to and including Jan. 2, 1932.

Painting the Picture Differently

Hearings were held recently at Belleville, Neb., by the State Railway Commission on the plea of the Omaha & Southern Interurban Railway operating between South Omaha and Fort Crook, for authority to substitute buses for rail service over the 8-mile road. Two hundred persons from the territory served appeared in protest, but the commission announced that unless the company was allowed to make the substitution it would not be able to prevent it from carrying out its determination to suspend all service. Opposition came largely from owners of unsold suburban lots and commuters since the route to be followed by the buses will open up new territory. The company is owned by the Omaha & Council Bluffs Street Railway. The accumulated deficit is \$30,000. Patrons complained that the servicing charges of the parent company and the division of transfer receipts were unfair to the interurban. Members of the commission recalled that when the affairs of the parent company were under scrutiny two years ago patrons of that company complained that the interurban was in effect subsidized by the city railway.

Brief Submitted Covering Taxis in Washington

The Capital Traction Company, Washington, D. C., on Oct. 26, submitted a brief to the Public Utilities Commission asking that the taxicab industry be so regulated that it will not offer unfair competition to the street railways. The brief constituted a summary of the company's testimony at the hearing recently together with arguments and references.

Two principal points are made in the document: (1) The taxicab industry is "in a most chaotic and unregulated condi-

tion" and (2) the basis of competition with the street railways is "unfair and discriminatory."

While the brief makes no direct plea for a return to meter operation, it denounces the zone system and the present low rates of fare. As to the flat-rate charge, the company contends that the "public is in no way protected against exorbitant or discriminatory charges."

The low fare enables the public "to secure transportation at far below the actual legitimate cost," the petition states, and "by such an unfair basis of competition there is diverted from the street railroads a large proportion of their legitimate patronage."

Move for Substitution in Milwaukee

Fifty Shorewood residents, living on North Downer Avenue and adjacent streets between East Edgewood Avenue and East Capitol Drive, recently asked the village board to take steps to have service by bus substituted for the present trolley service by the Milwaukee Electric Railway & Light Company. The company is open-minded in the matter although it has considerable money invested in tracks on the Downer Avenue line. Moreover, the Shorewood board on Oct. 12 passed an ordinance ordering the company to move its present bus parking space at East Capitol Drive and North Downer Avenue from the south side of Capitol Drive west of Downer to the east side of Downer Avenue north of Capitol Drive to take effect on Nov. 1. The company contended that an order to change the parking space should come only from the Public Service Commission.

Seattle School Fare Liberalized

School children of Seattle, Wash., will be given the privilege of riding the Municipal Railway's cars and buses on Saturdays at their regular school day rate of 2½ cents, effective at once. The Utilities Committee, in granting the action, turned down a counter proposal from A. E. Pierce, acting superintendent of the railway system, that a new school fare of 5 cents every day be adopted for school children instead of extending the privileges of the present fare to include Saturday. The hours for school tokens are from 6 a.m. to 6 p.m.

Councilman Ralph Nichols protested on the ground that the railway is not paying; that the Council should not act contrary to recommendations of officials of the Municipal Railway, and that it should give all possible support to Mr. Pierce and the recently appointed Street Railway Commission. Use of school tokens, except on school days, was suspended at the end of the vacation period, during which children were allowed to ride to and from the parks, beaches and other summer attractions at the regular 2½-cent school fare.

In submitting his counter proposal Mr. Pierce declared that the 2½-cent token fare is being "grossly abused." He pointed out that the hours for school fares have been so greatly extended, along with vacation and Sunday privileges, "that even young men and women of 20 or 21 years enrolled in mechanical and beauty culture courses use school fares." Mr. Pierce contends that this constitutes a serious loss of revenue to the railway.

San Bernardino Service Cut

The application of Pacific Electric Railways to reduce its service and rearrange its schedules on its Los Angeles-San Bernardino branch has been granted by the California Railroad Commission. The change will save approximately \$3,000 a month by reducing the present operation from 4,200 car-miles per day to about 3,700. During the hearing the railway amended its schedule as first proposed to provide for an additional trip during the evening peak hours. At the hearing it developed that the number of fare passengers using this service had decreased from 1,406,455 from January to August, inclusive, in 1929, to 1,198,583 for the similar period in 1930, and 1,041,176 for the like period in 1931. Revenue for the corresponding months dropped from \$484,674 in 1929 to \$451,406 in 1930, and to \$382,591 in 1931.

Parking Still a Problem

In order to determine the parking facilities that can be provided for the 20,000 government employees who will soon occupy the new buildings in the triangle area, the Treasury Department has recently completed a survey of the situation. The results of this survey are not being announced at this time, but it is understood that it has been ascertained that a large expenditure would be necessary to furnish sufficient parking accommodations for the government employees who drive their cars to work. Previous counts have disclosed that one-third of the total number of government employees ride down to their offices in automobiles. Heretofore, street space has been available, but among many officials the attitude prevails that it is not incumbent on the government to supply parking facilities for its employees — particularly when mass transportation facilities are available. Furthermore, the point is made that, in developing the triangle area for park purposes, nothing should be done to reduce the number of street car and bus lines serving the section. Tentative plans under consideration by those in charge of the park development call for the removal of some of the street car lines and the closing up of some of the streets that transverse the area. Traffic experts believe that the situation will be made worse if too much stress is laid on park development at the expense of transportation facilities.

Trolley Buses for Fitchburg

All street cars of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., are to be replaced with trolley buses. The mileage of trolley bus operation will be 12 miles of double route. Tracks now in the street will be covered with asphalt to give a smooth surface. Orders have been placed with the Brill Company for seven trolley buses, each seating 40 passengers, at a cost of \$80,000. The Ohio Brass Company will supply the overhead at a cost of \$35,000. The General Electric Company will supply the motors and control. Trolley bus operation is expected to start soon after Jan. 1. Headways will be reduced from 30 to 20 minutes.

Chicago "El" Sustained in Fare Case

Deciding in the Chicago Rapid Transit rate case that the city of Chicago has no status separate from the Illinois Commerce Commission and the attorney general of the State, the United States Supreme Court has dismissed the appeal filed by the city in an effort to bring about lower fares on the elevated lines. Specifically, the city sought to have an injunction set aside by which the elevated lines have prevented the enforcement of a lower rate schedule ordered by the Illinois Commerce Commission.

The city of Chicago was permitted to intervene in the original injunction suit in the district court. Upon the submission of a report of a special master appointed in the case, the district court held that the rates prescribed by the commission were confiscatory, and granted a permanent injunction against the enforcement of the order. It was brought out that the commission, while denying that the prescribed rates were confiscatory, introduced no evidence before the master or the court and took practically no part in the proceedings.

It is pointed out in the order of the Supreme Court dismissing the appeal that the Illinois Commerce Commission and the attorney general of the State were not parties to the appeal. The report of the special master dealt with the evidence in detail. It was stated in this report that the value of the Chicago Rapid Transit properties is not less than \$125,000,000 and that the company is entitled to a return of 7½ per cent a year upon this value.

G. E. Employees Accept New Unemployment Relief Plan

Employees of the General Electric Company have accepted the new unemployment relief plan, a tabulation of the votes announced on Oct. 28, showing that 89.5 per cent of employees eligible to vote had cast their ballots and that 97 per cent of these ballots favored adoption of the plan.

The total number of eligibles is slightly more than 39,000. These are employees who are members of the original and basic unemployment pension plan adopted by employee vote on Aug. 1, 1930. The number of votes cast thus far for the new plan is approximately 35,000. It was announced that voting would continue until Nov. 1 to permit participation by employees who were absent.

The plan provides for rotation of available work and other means by which hourly-rated and piecework employees on the payroll on Nov. 1 may be assured of receiving, during the following six months, not less than the equivalent of one-half of their average full-time weekly earnings up to an average of \$15 per week, and their actual earnings in case the latter amount to more than \$15 per week.

The unemployment emergency fund of the company, to which those employees earning 50 per cent or more of their average full-time earnings (including all office, administrative and executive employees and officials of the company) now contribute 1 per cent of their earnings will be augmented on Nov. 1 by increasing this contribution to 2 per cent, the com-

pany contributing an equal amount. The plan has been approved in principle by the board of directors, and in case these provisions prove inadequate, the board will be asked to authorize additional payments to the fund by the company, without additional payments by employees.

Financial News

(Continued from Page 660)

New York, N. Y.—In discussing the future of the Belt Line Railway Corporation, the sole remaining active property of which is the 59th Street cross-town line, S. W. Huff, president of the Third Avenue Railways, said on Oct. 26 that at the foreclosure proceedings last spring his company bid for the belt line property, but continued to operate it as a separate company. The sale was approved about ten days ago by the Transit Commission, and as soon as the absorption plans are completed the old name will be dropped. The line makes a profit, and will be useful for tie-in with the Third Avenue system.

Steubenville, Ohio—The State Utilities Commission has set Nov. 12 as the date for a hearing of the application of the Union Motor Transit, Inc., to sell its operating certificates and 22 buses to the Penn Bus Company, Martins Ferry, for \$90,834.

Baltimore, Md.—The United Railways & Electric Company is planning to place its request for relief from paying the park tax before the members of the City Council. This action will be taken as a result of Mayor Jackson's suggestion that the subject go before the Council. It is expected that the request will be in the form of an ordinance. The latest issue of *Trolley News*, published by the railway, is devoted almost entirely to the subject. On the front appears a reproduction of a sign reading "Motorists! Use and enjoy Baltimore's beautiful park system built and kept up for 72 years by street car revenues—now more than \$1,000,000 a year."

St. Louis, Mo.—The State Board of Tax Equalization on Oct. 20 voted two to one to reduce the tax valuation of the St. Louis Public Service Company from \$40,001,026 as recommended by the State Tax Commission to \$35,000,000. The reduction will probably cut the company's tax bill this year \$130,000. The \$40,001,026 recommended by the State Tax Commission was approximately the amount agreed upon by the company and tax authorities of St. Louis and St. Louis County early this year after the company had resisted in the courts the \$44,482,395 tax assessments made by the State in 1930. Through consent decrees in the St. Louis and St. Louis County Circuit Courts the assessments were reduced to \$40,001,894. That reduction cut the company's 1930 tax bill by \$115,838. The reduction just approved means the company's tax bill this year will be \$245,000 below the original assessment for 1930. The company sought to be taxed on \$30,000,000 this year.

Memphis, Tenn.—The assessment of the Memphis Street Railway for purposes of taxation has been decreased from \$8,000,000 to \$7,500,000.

East Liverpool, Ohio—J. D. Deweese has been discharged as receiver for the Youngstown & Ohio River Railroad, an electric line running between Salem and East Liverpool, abandoned several months ago. An order entered by Judge Lones in Common Pleas Court directed Mr. Deweese to turn over all railroad records in his possession to Briggs & Turvais, Blue Island, Ill., who purchased the property for dismantling. The application of the receiver for confirmation of all reports has been sustained, and accounts have been approved as modified.

Newark, N. J.—Theodore Boettger has been elected a director of the Public Service Corporation of New Jersey to fill the vacancy caused by the death of Uzal H. McCarter.

St. Louis, Mo.—The State Public Service Commission will conduct a public hearing at Jefferson City on Nov. 17 on the application of the St. Louis Public Service Company for permission to sell its two power plants to the Union Electric Light & Power Company and to enter into a new service contract with the power company.

New York, N. Y.—J. V. Davies has been elected a director of the Hudson & Manhattan Railroad to succeed the late William H. Williams.

Boston, Mass.—Governor Ely has re-appointed Henry I. Harriman of Newton as a trustee of the Metropolitan Transit District.

New York, N. Y.—The Commonwealth & Southern Corporation has declared for six months ending March 1, 1932, a dividend of 15 cents on the common, payable March 1, 1932 to stock of record of Feb. 5, against previous declaration of 10 cents quarterly. The company stated it deemed it wise to reduce the current dividend to a rate which is well within present earnings.

Regulation and Legal

Rochester, N. Y.—The New York Central Railroad is opposing franchises granted to Rochester, Niagara Falls & Buffalo Coach Lines, Inc., successor to the electric railway of similar name, by Public Service Commission. Illegal competition with its passenger service between Albany and Buffalo is charged by the road.

Reading, Pa.—The Public Service Commission has decided in the case of the Reading Transit Company against the Central Taxicab Company that a taxicab company which makes a practice of calling for certain school children and taking them to and from school is not violating the terms of its certificate. The record showed that the taxi com-

(Continued on Page 663)

Calumet District Sale Approved

The Public Service Commission of Indiana has authorized the sale of the Calumet Railways, Inc., the Shore Line Motor Coach Company and the Mid-West Motor Coach Company, all properties of the Midland United Company, Chicago, to the Chicago & Calumet District Transit Company, controlled by Walter J. Cummings, Chicago. All three transportation units operate in the Calumet region of Indiana, chiefly in Hammond, East Chicago and Whiting and between these cities and Chicago.

The Cummings organization will ultimately pay \$1,050,000 for the properties. Under an agreement approved by the commission the purchasers will pay \$5,250 every three months for 50 years, beginning Oct. 1, 1931. The sale involves 27 street cars of the Calumet Railways, Inc., and 110 buses of the Shore Line and the Mid-West companies. Maintenance equipment is also included. The new company is to lease the garage of the Shore Line Motor Coach Company in Hammond for a period of five years and will establish headquarters there.

Mr. Cummings is to spend \$150,000 in a general reorganization of the three carriers. The street car line will be the backbone of the system, with the buses in general acting as feeders. More money will be spent on trolley buses and other improvements as fast as conditions warrant. All this will be done without applying for new operating franchises in any of the affected cities. The new company will operate under the present franchises and the permits of necessity and convenience.

The Midland United Company had originally applied to the Indiana Commission for permission to discontinue the operation of the Calumet Railways, Inc., after attempts to obtain a "service-at-cost" franchise in Hammond, East Chicago and Whiting had been unsuccessful. Its request to discontinue was granted by the commission, but later the plea was withdrawn when Mr. Cummings arranged to purchase the properties.

Receiver for Fort Wayne-Lima Road

Frank H. Cutshall, president of the Old First National Bank & Trust Company, Fort Wayne, recently took over the operation of the Fort Wayne-Lima Railroad as federal court receiver. Subsequently, Mr. Cutshall and Frank C. Kahle, Lima, Ohio, were named ancillary receivers for the company in Ohio by the Northern Ohio District Federal Court at Toledo. The court ordered operation of the 65-mile line from Fort Wayne to Lima, Ohio, to be continued. The petition asking for appointment of a receiver charged that the company was insolvent, owing large sums for track and terminal rentals in Indiana to the Indiana Service Corporation and to the Lima Street Railway. The company has about \$440,000 of mortgage bonds outstanding and owes approximately \$75,000 to general creditors.

The road forms an important link in the electric railway systems of Indiana and Ohio. It has been operated by the Indiana Service Corporation for a number of years and will continue so under the receiver.

Regulation and Legal

(Continued from Page 662)

pany had been transporting a group of school children to and from several schools on regular school days under an arrangement made with the parents of the children to call every morning, transport the children to school and return them to their homes in the afternoon. Regular meter rates were charged for this service under a tariff that provided the same rate for one or five persons. At the hearing an officer of the company testified that where there were small children, no extra charge was made if the number exceeded five.

♦

Washington, D. C.—In indicating his intention to reintroduce his bus regulation bill next session, Senator Couzens, chairman of the Interstate Commerce Committee, has announced his intention of including trucks. Senator Couzens is not in sympathy with the proposals that the dominant feature of regulation should be devoted to reducing the competition of buses and trucks on the railroads. Since highway transportation is becoming more important to the country every year, he is understood to feel that whatever legislation is decided upon should be designed to promote rather than to restrict the bus and truck industry.

♦

Omaha, Neb.—The Omaha & Council Bluffs Street Railway says of Commissioner Koutsky's proposal that the city ask the Nebraska State Railway Commission to establish a 5-cent street car fare in Omaha, that it is a continuation of the commissioner's purpose to make the street railway his political football. If the city applies for a 5-cent fare, the company's answer will be that the present fare does not give a return on the fair value of the property.

General

Brooklyn, N. Y.—The Downtown Brooklyn Association has retained Day & Zimmerman to make a survey of the Fulton Street elevated line of the Brooklyn-Manhattan Transit Corporation to determine: Its value, present and future, to the downtown business section; and the value to that section of its removal with the substitution of the four-track subway now in course of construction and intended to take its place as a traffic carrier.

♦

Oakland, Calif.—B. W. Campbell, A. B. Peterson and R. F. Gutchard have submitted an application before the Council for a franchise to operate freight lines on Poplar Street from Third to Twelfth Streets. About two years ago, the predecessor to the present East Bay Street Railway asked a revocable permit for a spur track connecting the Key Route at Twelfth Street and Poplar and the Western Pacific main line at Third and Poplar, thus creating a proposed belt line service which would link many industrial plants to both railroads.

Indianapolis, Ind.—The Store-Door Delivery Corporation, a motor trucking concern, has petitioned the Public Service Commission for permission to operate twelve motor freight lines throughout Indiana. If established, most of the routes would parallel existing interurban routes but some would replace railway routes withdrawn.

♦

Toronto, Ont.—Facing a continued reduction in the number of passengers carried and the consequent decrease in revenue, the Toronto Transportation Commission, operating the local city-owned railway and bus lines, has been forced to adopt a program of economy consistent with the efficient operation of the system. In keeping with other economies, it has accordingly been decided to reduce the size of *The Coupler*, employee publication, from twelve to four pages, through greater condensation.

♦

Vancouver, B. C.—Work is being completed on the installation of a number of the latest type fluted-steel trolley poles on Granville Street along sectors between Broadway and Sixteenth Avenue and 25th to 41st Avenues. The new poles carry ornamental lighting fixtures besides holding the street railway wires. The electrical engineering department of the British Columbia Electric Railway has already made several installations of this kind on the main streets here. Formerly, wooden poles held the trolley wire, and lighting standards were set alongside.

♦

Worcester, Mass.—Negotiations between the Boston, Worcester & New York Street Railway and the State Department of Public Works have failed to produce an agreement to have the company remove the rails from the 5-mile stretch intended for use as part of the Boston and Worcester superhighway from Framingham Center to the Wellesley line. The railway is dissatisfied with the price which the State is prepared to pay, and the Public Works Department is going ahead with plans on the assumption that the rails will still be there when construction begins. The Boston, Worcester & New York now runs trolley cars from Boston to Framingham, but from there buses are employed to Worcester. The railway at the same time runs a bus line between Boston and Worcester by way of Marlboro, Waltham and Watertown.

♦

Jacksonville, Fla.—Negotiations between representatives of the Jacksonville Traction Company and members of the City Council's Special Franchise Committee appear to be moving toward settlement. At a conference between the company representatives and the committeemen, the latter made it plain that they would favor a franchise that will relieve the city of the \$155,000 bond debt it will acquire Jan. 1 by annexation of South Jacksonville. That amount is represented in outstanding bonds on the municipally owned South Jacksonville Street Railway. Views of the committeemen were expressed after railway officers had submitted a new proposal to give the city \$155,000 of 6½ per cent income bonds for the Southside lines as a concession toward obtaining a new franchise.

Able Analysis of Seattle Municipal System's Troubles

In a report on the Municipal railway, Philip Tindall, president of the Seattle City Council, expresses a hope for the future security of the system, under the unhampered expert management and revised debt-payment contract now sought for it. He advocates:

1. Transfer of contributions of \$150,000 a year to the railway trainmen's pension fund from the railway budget to the general fund.

2. Reduction by \$533,000 a year in payments, interest and principal to the Puget Sound Power & Light Company.

3. A decrease of \$58,000 a year in the railway's power bill.

These three measures, he states, would save the railway system about \$741,000 a year. He attributes the present financial difficulties of the railway to four primary causes:

1. Inadequate and diminishing revenues, due to loss of patronage and to insufficient early fares.

2. Excessive cost of rehabilitating and maintaining the system, due to its run-down condition when acquired by the city.

3. Excessive interest payments on the purchase price bonds, due to excessive price agreed to be paid for the system.

4. Excessive payments on the principal of the purchase price bonds.

Councilman Tindall declares that with "half a chance" the railway will pull through successfully. He is opposed to abandoning it as a municipal enterprise.

The Tindall report shows that at the close of 1930, the system, in addition to meeting the costs of operation and maintenance, had paid \$7,324,100 on the principal and \$7,962,272 interest on its various utility and revenue bonds and warrants. The interest on \$775,000 of general bonds had been paid from taxation. It had paid eight installments aggregating \$6,664,000 on the principal of the \$15,000,000 purchase price bonds. With one more installment, the purchase price would have been half paid. This, Councilman Tindall contends, is a remarkable record.

His report points out that the lines sustained a staggering cash deficit during the first year and nine months of city ownership due to the inadequacy of the 5-cent and 6½-cent fares. With the inauguration of 8½ cent fare at the beginning of 1921, a start was made toward reduction of the deficit. The return to the 5-cent fare for 108 days in 1923 resulted in a decrease of \$518,139 in revenues that year. This, added to the weight of other factors, has made recovery from the original cash deficit impossible. At the close of 1930, the cash deficit, notwithstanding the moratorium, amounted to \$812,435.

Analysis of Mr. Tindall's report shows that 11,673,790 fewer pay passengers used the municipal lines in 1930 than in 1921, the first year under the 8½ cent fare, and that the revenues were \$942,171 less in 1930 than in 1921. He contends that the revenues since 1921 were \$4,001,047 less than they would have been had the patronage continued as it was that year, and had the 5-cent fare not been restored for 108 days in 1923.

Because of the run-down condition of

Coming Meetings

Nov. 19-20—Middle Atlantic States Equipment Men's Association, York, Pa.

Jan. 27-29, 1932—Electric Railway Association of Equipment Men, Southern Properties, Richmond, Va.

the tracks and equipment when the purchase was made, the report cites, maintenance alone cost \$9,748,596 up to the end of 1930, while extensions and betterments cost \$2,532,143, a total of \$12,280,738 in approximately twelve years. This, the report declares, is far in excess of the amount applied to other systems. Mr. Tindall holds that the city paid at least \$5,000,000 too much for the system, and that the interest on this excess price has amounted to \$3,000,000 since the system was bought. The report holds that the original contract should have spread the payments designed to liquidate the cost over 40 years.

Among secondary causes for the railway difficulties, the report cites a bond issue of \$1,655,000 to acquire other private lines and pay for new construction; the Supreme Court ruling in 1926 that compelled the city to pay a tax of \$545,370 for 1919, the year the lines were taken over.

Operating and other economies have reduced the payroll \$799,942 from 1920, the first full year of city ownership, in which the men received an increase of 9.4 cents an hour. The number of opera-

One Useless Anxiety

IT is devoutly to be hoped that we shall soon abandon the search for ways to insure that "nothing like this shall ever be allowed to happen again. First, every generation is infatuated with its own wisdom and bent upon making its own mistakes. Second, we are still too shaken in nerves and to engrossed in the immediate tasks to spare time or energy or cool judgment for the wise remodeling of our economic machinery for the longer future.

Of one thing we may be sure, the successors to whom we solemnly entrust a planned economy will in due time perceive how obsolete and inapplicable it has become. We know, of course, that this world depression has come in sequence to the World War, and the spirit of all-around recklessness which it bred. But who knows that the world, relieved of the horrid spectre of war, will not go straightway into such a chain of South Sea Bubbles as will inevitably produce the depression of 1951-54, with its unprecedented millions of unemployed and its glittering plans for preventing a repetition of such disasters in the future? All of which, of course, is no reason why we should not abolish war if we can. But as for the abolition of future depressions, let us first get rid of the only one we have.

—Condensed from Barron's.

tors has been reduced from 1,932 to 905, but the increased pay has offset the effect of the reduced number of trainmen to the extent of about \$430,000 a year. Wages have been raised from 50 cents in 1919 to 80 cents an hour in 1930. Mr. Tindall also challenges the theory that the entire cost of paving between tracks should be paid for by the railway system.

Councilman Tindall urges the City Council and the citizens to back the railway commission of five citizens named by Mayor Harlin, in a determined effort to adhere to business principles in the operation of the system. He declares political interference to be largely responsible for the system's present condition.

Junior Engineers Wanted for Commission Work

The New York State Civil Service Commission will hold an examination on Nov. 21 for which application must be filed not later than Nov. 7 for the position of assistant engineer (heavy electric traction work) Department of Public Service. The salary will be \$2,641 to \$3,240. One immediate appointment is expected at \$3,000. The duties of the position include examination of heavy electric traction equipment of railroads. Candidates must have had not less than seven years of experience in heavy electric traction, including not less than three years of shop experience, and not less than four years of supervisory experience. Technical education will be credited in lieu of experience.

Also an examination will be held for assistant engineer (valuation), Department of Public Service, State division, Public Service Commission. The salary will be \$2,000 to \$2,640. One immediate appointment is expected at Albany at \$2,000. Candidates must have had not less than four years of satisfactory experience in valuation or construction. Technical education will receive credit in lieu of experience in proportion to its value.

Receivers for Empire Public Service

Chancellor Wolcott of the Delaware Court of Chancery, at Wilmington, upon petition of the Empire Corporation, has appointed former Federal Judge Hugh M. Morris, of Wilmington, and W. E. Kennedy, of Baltimore, as receivers for the Empire Public Service Corporation, and, upon petition of Robert W. Rea, appointed Judge Morris and Herbert W. Briggs, of New York City, as receivers for the Electric Public Utilities Company. The Empire Corporation controls the Empire Public Service Corporation, which, through its subsidiaries, one of which is the Electric Public Utilities Company, renders utility services in various communities in nine States. Among the affiliated properties is the Western Ohio Railway & Power Corporation, Lima. A debenture holders' committee to represent the \$3,500,000 principal amount of debentures of the Empire Public Service Corporation has been formed for which Bankers Trust Company will be depositor and Rushmore, Bisbee & Stern of New York City, counsel.

PERSONAL MENTION

A. C. Colby Made Manager in Calumet District

A. C. Colby, for the last eleven years superintendent of equipment for the Detroit Municipal Railway Detroit, Mich., has been appointed general manager of the newly organized Chicago & Calumet District Transit Company, operating in Hammond, East Chicago and Whiting, Ind., and between those cities and Chicago.

Mr. Colby assumed control, on Oct. 8, of the former Calumet Railways, Inc., the former Shore Line Motor Coach Company, and the former Mid-West Motor Coach Company when these carriers were consolidated into the Chicago & Calumet District Transit Company following their purchase from the Midland United Company, Chicago, by Walter J. Cummings under approval from the Public Service Commission of Indiana.

Mr. Colby is widely known as a successful operator. In Detroit, in less than ten years, he directed the purchase of \$30,000,000 in physical equipment for the municipal railway. In the Calumet region of Indiana he will have charge of the immediate expenditure of \$150,000 to reorganize the carriers just purchased by Mr. Cummings. As conditions permit, trolley buses and other modern equipment will be added to the system. The street cars will be the backbone of the system with buses serving as feeders.

A. C. Spurr Reassigned

A. C. Spurr, for the past five years manager of the Wheeling Traction Company, Wheeling, W. Va., has been reassigned to the staff of the West Penn Company at Pittsburgh, Pa. In the changes in personnel at Wheeling which Mr. Spurr's withdrawal has necessitated, E. L. Yaeger, receiver for the Wheeling Traction Company, has appointed H. B. McCune to succeed Mr. Spurr. The new personnel of the company announced with the appointment includes R. T. Carnes, comptroller; C. M. Farsh, general superintendent; Frank C. Martin, master mechanic; F. W. Neer, storekeeper; Ray C. Beuter, cashier; Edward W. Wright, auditor; and E. L. Lash, claim agent.

Messrs. Plake and Flanders in New Posts

F. M. Plake has resigned as chief engineer of the Public Service Commission of Missouri, and J. E. Flanders, assistant chief engineer, has been appointed chief engineer.

Mr. Plake has been connected with the engineering department of the commission for the past ten years and has been chief engineer for more than four years. He is a graduate of the engineering school of the University of Kansas and went with the commission after years of valuation duties with the Interstate Commerce Commission. He has been appointed to the newly created position of valuation engineer with the Union Electric Light & Power Company, St. Louis.

Mr. Flanders received his engineering education at the University of Missouri. He has been connected with the engineering department of the commission for nine years during which time he has had active charge of a number of appraisals of the larger utility properties of the State.

T. Julian McGill Heads Twin City Rapid Transit

T. Julian McGill, former vice-president and general manager, of the Twin City Rapid Transit Company, Minneapolis, Minn., has been named president by the board of directors of the company to succeed Horace Lowry, who died on Aug. 22. Mr. Lowry had been president of the



T. Julian McGill

company since 1916. Mr. McGill will continue as manager of the lines.

The board also accepted the resignation of Donald Goodrich as a director and named in his place Frank Carrel, Quebec City, Que.

Regarded as an authority on transportation problems, Mr. McGill was largely responsible for development of passenger transportation by bus between Minneapolis and St. Paul and surrounding territory.

While he is an electrical engineer by training, much of his work has been in the sales end of the industry. For many years he was associated with the Westinghouse Electric & Manufacturing Company.

Mr. McGill was born at Leesburg, Va., on Aug. 26, 1877. He was educated in public schools and at Johns Hopkins University.

After four years with an electric company in Chicago as a sales manager, he came to Minneapolis in 1898 as district sales head for the Westinghouse company. In 1909 he was transferred to Atlanta to take charge of the Southern district and in 1914 to Chicago to head the Western territory. In July, 1921, he became vice-president and general manager of the Twin City Rapid Transit.

Additional Post for W. H. Sawyer

As noted in ELECTRIC RAILWAY JOURNAL News for Oct. 24, Willits H. Sawyer has been elected chairman of the Executive Committee of the Iowa Public Service Company, Sioux City Gas & Electric Company and Sioux City Service Company, and will devote a portion of his time to active supervision in Iowa of these properties. Mr. Sawyer will continue his New York office at 120 Broadway, and also his consultant and sponsorship activities including his positions as co-receiver of Southern Public Service Company, co-receiver of Carolina-Georgia Service Company and receiver of Springfield Railway, Springfield, Ohio.

C. W. Milner Leaves Louisville Railway

Charles W. Milner, of the law firm of Humphrey, Crawford & Middleton, who served as general counsel for the Louisville Railway, Louisville, Ky., since 1928, has resigned from the railway. Prior to 1928 Mr. Milner was assistant general counsel under Churchill Humphrey as counsel. Churchill Humphrey's father before him was company counsel. Since 1921 Mr. Milner has taken part in company rate, franchise and other cases.

No explanation of the resignation was made, but it has been intimated that the company may be planning to discontinue regular employment of a general counsel under a retaining fee. In view of his knowledge of company matters and his ability Mr. Milner may continue to represent the company under retainer.

Changes in British Transport Managements

Major Robert McCreary, B.A., B.Sc., M.Inst., C.E., has been appointed general manager of the Belfast Corporation tramway and bus undertakings, succeeding W. Chamberlain, appointed chairman of an area traffic commission under the Road Traffic Act. Major McCreary has had a varied professional experience, and during the war, as an officer in the Royal Engineers, he carried out much railway construction in France and Belgium, and gained the M. C. Latterly, he has been permanent way engineer at Belfast.

Percy Clegg, hitherto electrical engineer and manager at Bingley, has been appointed electrical engineer and transport manager at Haslingden.

H. E. Blackiston, general manager and engineer of West Hartlepool transport service, has been appointed engineer and transport manager for Ipswich.

Robert Taylor, chief assistant in Dundee Corporation transport department, has been appointed manager, in succession to D. P. Morrison, appointed manager at Hull. From time to time, Mr. Taylor has had complete control as interim manager. He has made a special study of road transport legislation, and has frequently given evidence before the area traffic commissioners.

Messrs. Dunn and Lee Head Simmons-Boardman Company

Directors of the subsidiary companies controlled by the Simmons-Boardman Publishing Corporation have elected the following executive officers: Simmons-Boardman Publishing Company, Samuel O. Dunn, chairman of the board, and Henry Lee, president; American Builder Publishing Corporation, Henry Lee, chairman of the board, and Samuel O. Dunn, president. These executive positions were held by the late Col. Edward A. Simmons. Out of respect to the memory of Colonel Simmons, the chairmanship and presidency of the Simmons-Boardman Publishing Corporation, the holding company, were not filled at this time.

Heretofore, Mr. Lee has served the Simmons-Boardman companies as vice-president in charge of its business department, while Mr. Dunn has been vice-president and editor-in-chief of the *Railway Age* and its other publications.

H. B. Hewitt has assumed the management of a new division of the Moto Meter Garage & Equipment Company, Toledo, Ohio. He was formerly assistant to J. A. Queeney, vice-president in charge of operations of Mitten Management (Philadelphia Rapid Transit). Mr. Hewitt will undertake the further development and distribution of Moto Vita, a recently developed instrument for analyzing exhaust gas. His previous engineering experience in carburation in relationship to engine performance and economy makes him particularly well fitted for his new duties.

William F. Allen has resigned as advertising manager for the St. Louis Public Service Company, St. Louis, Mo., T. M. Pegram, assistant advertising manager, is temporarily in charge. Mr. Allen plans to return to newspaper work.

Roy Chambers has resigned as superintendent of the Westfield division of the Springfield Street Railway, Springfield, Mass. Mr. Chambers began 23 years ago as conductor and was subsequently inspector, chief inspector and division superintendent.

Charles Michaels, Logansport, has been appointed chief railroad inspector for the Public Service Commission of Indiana. He succeeds the late William P. Holmes. He will retain J. K. Smith, Elkhart, and Louis Phillips, Vincennes, as inspectors.

Col. Albert T. Perkins, president and general manager of the People's Motor Bus Company, St. Louis, Mo., has returned from a three-month trip through Central Europe. He noticed no disposition in Central Europe to adopt the bus on a scale comparable to that in the United States.

Sidney H. Sayles has resigned as superintendent of the Palmer division of the Springfield Street Railway, Springfield, Mass. Mr. Sayles has been connected with the company for 39 years, beginning as a conductor in Springfield in 1892. He has been superintendent at Palmer for nineteen years.

Leon M. Bazile, former assistant attorney-general, has been elected president of the Richmond-Ashland Railway, Richmond, Va., to succeed the late S. W. Zimmer, Petersburg. Mr. Bazile is understood to have been given a free hand in his efforts to rehabilitate the road, which in recent years has felt the effects of competition from motor vehicles, particularly privately operated cars.

Frank Lythgoe, manager of buses for the Leigh (England) Corporation, has been appointed manager of Rawtenstall Tramways at a salary of £500 a year, rising to £550.

C. C. Coulthard has resigned as superintendent of the New Castle Electric Street Railway, New Castle, Pa. He has been with the company 25 years, starting as a motorman. He will be succeeded by T. C. Moore, Niles, Ohio, long in the service of the Penn-Ohio System, of which the New Castle line is a part.

William F. Boyd has been appointed superintendent of the Steubenville and Wellsburg-Weirton, W. Va., division of the Wheeling Traction Company. Mr. Boyd has been division superintendent in Steubenville for eight years.

Charles E. Lawrence ended 31 years of service with the street car system of Hammond, East Chicago and Whiting, Ind., when on Oct. 12 he tendered his resignation as general manager of the Calumet Railways, Inc., to the Chicago & Calumet District Transit Company, new owners of the line. Mr. Lawrence entered electric railway work in South Chicago, Ill. When the operations of the "Green Line," serving Hammond, East Chicago and Whiting, were centered in Hammond he became superintendent. Later he was made vice-president and general manager. With the reorganization of the line as the Calumet Railways, Inc., he retained the position of general manager.

M. T. Montgomery, connected with electric railways in the United States, Mexico and Cuba for more than 30 years, has sailed for Chile under a retainer which contemplates a special railway assignment for him under A. W. McLimont in connection with utility work at Valparaiso and Santiago for properties included in the group which is operated under American and Foreign Power Corporation auspices.

Perry S. Painter has resigned as assistant general counsel of the Missouri Public Service Commission to accept a place on the legal staff of the United States Department of Agriculture at Washington, D. C. In 1921 Mr. Painter became private secretary to Arthur M. Hyde, then Governor of Missouri and now Secretary of Agriculture in President Hoover's Cabinet. Later he served as a member of the Public Service Commission and also as chief counsel before becoming assistant general counsel of the commission. At Washington he will be counselor for the solicitor of the Department of Agriculture.

G. W. Evington, formerly chief inspector and superintendent of the ferry terminals for the Market Street Railway, San Francisco, has been advanced to the position of superintendent of the Sutro and McAllister divisions of the company. William Loughrey, formerly inspector for the company stationed at Gough and Market Streets, has been named to succeed Mr. Evington as chief inspector and superintendent of the ferry terminals. Mr. Evington started with the company in 1913 as a motorman. Mr. Loughrey entered the service in 1903 as a gripman.

H. S. Williams has succeeded A. C. Colby, resigned, as acting superintendent of equipment for the Detroit Municipal Railway, Detroit, Mich. Mr. Williams was formerly assistant superintendent of equipment.

Ed. Hamprecht has been appointed traffic manager of the Western Ohio Railway & Power Corporation, Findlay, Ohio, to succeed the late C. O. Sullivan.

John J. Curtin, trial lawyer and counsel to Alfred E. Smith during most of his administration as governor of New York, has been engaged by the New York Transit Commission to render special legal services with respect to transit unification in New York City, including the preparation and completion of the plan and hearings thereafter, preparation of the final plan and proceedings necessary to carry it into effect. Mr. Curtin was graduated from Manhattan College, where he received B.A. and M.A. degrees, and has an LL.B. from St. Lawrence University.

Joseph A. Devery, assistant corporation counsel, will retire from New York City's law department to enter private practice, specializing in franchise and public utility litigation. Since he entered the corporation counsel's office in 1918, Mr. Devery has been known as one of the city's fare experts. Preparation of the city's 5-cent fare case fell to him, and he has handled most of the transit and bus litigation in the past ten years.

W. C. Myers, formerly special representative at St. Louis, Mo., has assumed his new duties as general superintendent of the St. Louis Electric Terminal Railway, St. Louis & Alton Railway and McKinley Bridge Roadway, a part of the Illinois Terminal Railroad in St. Louis. C. F. Handshy, inspector of transportation, has also assumed the duties of freight claim agent. His headquarters are in the Shell Building, St. Louis, Mo.

Carroll J. Sinnott has been elected vice-president of the Transportation Management Corporation, a subsidiary of the Parmelee System (taxicabs), in charge of public relations in New York. Mr. Sinnott also continues as president of the Yellow Taxi Corporation, another Parmelee unit. E. A. Dannemann will succeed Mr. Sinnott as manager of the Manhattan division of Parmelee.

J. Lightbody, publicity manager of the British Columbia Electric Railway, Vancouver, B. C., was named to serve as chairman of the Publicity Committee in connection with British Columbia Week, organized recently under the auspices of the Vancouver Board of Trade. Mr. Lightbody is also chairman of the advertising and sales bureau of the Vancouver Board of Trade.

Charles Venable, Noblesville, Ind., for many years superintendent of the Indianapolis-Logansport division of the Union Traction Company, succeeded by the Indiana Railroad, has resigned. He was with the company 28 years. He ran the first car between Tipton and Indianapolis. He had served as motorman, conductor, dispatcher and superintendent.

OBITUARY

Thomas A. Edison

The death of Thomas A. Edison on Oct. 18 brought not only nation-wide but worldwide mourning in its train. At first as the marvelous youth, then as the accepted miracle worker and finally as the Grand Old Man of his country, his contemporary fame spanned the terms of a dozen Presidents, and, despite his own modesty, dimmed the renown of all other Americans who have worked in the same broad field of science and invention. It spread abroad further than that of any other American contemporary with him until in men's minds the electric age and the age of Edison became synonymous.

The range of the man's activities has long been a matter of public record. So far as this industry is concerned his most material contributions were made in the pioneer period of development. Edison had invented an electric motor before he perfected the incandescent lamp. Early in 1880 he began the construction of a stretch of track close to the Menlo Park laboratory, and at the same time built an electric locomotive to operate over it. The first track was about a third of a mile in length, this being increased afterward to 2½ miles. Operation on this miniature line was successful. In 1883 patents of Edison and Stephen D. Field were exploited on an early third-rail exhibition track built at Chicago. Edison never followed up his inventions in the traction field. He was later interested in storage-battery cars, but the overhead trolley drove them from the field. He went to Europe in 1889 and installed a \$100,000 exhibit at the Paris Exposition of that year.

With the opening of 1930, the investment in the United States alone in the light and power industry, the electric railways and the electrical manufacturing industry—all founded in whole or part on Edison's inventions—was \$19,500,000,000; the annual gross revenue was more than \$6,000,000,000, and the annual capital additions were \$1,250,000,000. The combined capitalization of electric light and power companies alone in the United States is now \$11,800,000,000, the invested capital of the great electric manufacturing companies approximates \$3,000,000,000, and the valuation of all affected industries of every sort would reach figures of almost astronomical dimensions. The effect of Edison's inventions on the single item of copper has been incalculably vast.

As *Electrical World* said in an appreciation of Edison, courageous, optimistic, unsentimental, loving to overcome obstacles, charitable in his impulses and



Thomas A. Edison

adhering to high moral standards, he united iron nerve with an active imagination. Usually phlegmatic, he could be roused to anger by faults in others, particularly—among the more venial shortcomings—those of laziness and incompetence. His philosophic cast of mind was shown by the view he took of his own deafness, which he held had an advantage in facilitating concentration upon the task in hand. His religious views were summed up by himself as embodied in a belief in the existence of "some vast intelligence governing this and other planets." He was a man without any hobbies apart from his work, unless a love of sketching could be called one.

Albert J. Beall, 75, who prior to his retirement served as day and night supervisor of the Ames carhouse of the Omaha & Council Bluffs Street Railway, Omaha, Neb., is dead. Mr. Beall entered the employ of the company in December, 1887, while street cars were still being drawn by horses. After five years, during which time he also served as gripman on the cable cars, Mr. Beall was promoted to night supervisor of the Ames carhouse, later being transferred to the Pierce Street carhouse as day foreman. In 1917 he again resumed his duties as day supervisor of the Ames division. This position he held until the time of his retirement, April 1, 1929.

E. G. Hall

Edward Grayson Hall, communication engineer for the Chicago Rapid Transit Company, the North Shore Line, the Chicago Aurora & Elgin Railroad, and the Public Service Company of Northern Illinois, died at Youngstown, Ohio, on Sept. 8, from injuries received when he crashed in his airplane while attending the national air races at Cleveland.

Born at Burkes Garden, Va., on Nov. 20, 1885, Mr. Hall received his education at schools in Graham, Va., and the Polytechnic Institute at Blacksburg, Va. He entered the employ of the Chicago Rapid Transit Company on Aug. 1, 1908, as chief electrician in the electrical department, and served in various other capacities until his appointment as communication engineer in 1927. His ability in his chosen field of service is attested by the fact that a complete telephone system interconnecting the various companies serving the greater Chicago area was installed and developed to a high point of efficiency under his direction.

An amateur air enthusiast, Mr. Hall had flown his own plane extensively since receiving his pilot's license months ago.

J. K. Bruce

Joshua Kidd Bruce, formerly general manager of London County Council Tramways, died on Sept. 23. He retired from the service more than a year ago on account of ill health, and at the time of his death he had barely attained the age of 60 years. His career as a tramway manager and organizer was remarkably successful, as he changed the undertaking from one working at a loss to one working at a profit, and this despite specially heavy capital liabilities inflicted by the wide use of the conduit system, for the inauguration of which he was not responsible, and despite intense bus competition.

Born in Strathmore, Scotland, in 1871, he went to London as a veterinary surgeon, and took charge of the stud of horses then belonging to the London Tramways. When that undertaking was bought by the London County Council, he became a municipal employee, and turned to administration when the system was electrified in 1899.

When in 1925 he became general manager he was faced with intense difficulties, but his long experience with the system stood him in good stead. Slowly new ideas and new methods were introduced. He speeded up the cars, and made them more comfortable and attractive to the public. Results soon came, and the London County Council trams produced profits. Not only were his services publicly acknowledged, but he was given money grants. The average speed including stops of the London cars is now about 10 m.p.h., probably the highest speed on crowded streets anywhere in Great Britain.

Capt. John B. Mattingly, prominent in the business life of Yazoo City and Vicksburg, Miss., since the Civil War as an operator of boats on the Mississippi and the Yazoo rivers, as a coal merchant in Vicksburg, and as a capitalist interested in predecessor companies to the Mississippi Power & Light Company, died on Oct. 3.

Ferdinando Cusani Confalonieri

Marquis Ferdinando Cusani Confalonieri, who by his efficient work, notably in electric traction, had attained for himself in Italy and abroad an imperishable place in engineering annals and in civic circles, died on Sept. 24 at his home, Palazzo di Carate Brianza, Milan, Italy, at the age of 35 years. He succumbed to a long painful heart ailment, believed to have been greatly intensified by tremendous tasks self-imposed in connection with the problem of traffic regulation at Milan incident to the recent international exposition held there. He was the son of Marquis Luigi Cusani Confalonieri, former ambassador from Italy to the United States, and of Marchioness Cusani Confalonieri Casati. A man of powerful intellect and extraordinary culture, his whole life since boyhood had been a marvelous example of



Ferdinando Cusani Confalonieri

activity dedicated to the public good. Reared largely in the United States during the time of the portfolio of his father at Washington, Marquis Cusani had an attachment for the United States made ineradicable by his early associations here, and kept alive by a large number of personal contacts, and through his contributions to publications here, notably *ELECTRIC RAILWAY JOURNAL*, on scientific subjects of which he was a master.

A man of simple habits and a great love for knowledge, he had acquired a profound appreciation of scientific subjects pertaining to modern mechanical traction in general, and, in particular, to city tramways. He served in the World War.

So wide was his range of interest that on his many trips to foreign lands he studied methods of fire prevention, and did great work in forming technical associations and voluntary fire departments. He was always ready to advise and to give the benefits of his experience to large cities in their technical undertakings. New undertakings did not daunt him. In fact, they spurred him to greater incentive as the record of his accomplishments testifies.

He is survived by his parents, a sister and many relatives and friends.

William F. Jenkins, known for the part he played in the development of an electrified street railway system in Richmond, Va., is dead. He was one of the

promoters of the company under which the Broad Street horse car lines in Richmond were electrified by the late John Skelton Williams, comptroller of the currency in President Wilson's cabinet. Later, he helped to organize the Richmond & Henrico Railway. While he was serving as general counsel for this group, a line was constructed from the city limits in the west on Brook Avenue to Fulton, in the extreme eastern section of the city. This line now forms a part of the Virginia Electric & Power Company's property. Mr. Jenkins was 72 years old.

J. A. Hanna

Joseph A. Hanna, well known in the electric railway supply trade, died at his home at Warren, Ohio, on Oct. 12 after a short illness. Practically all of Mr. Hanna's business life was devoted to the electric railway carbuilding industry. He started in 1885 with the Brill Company in Philadelphia, and served subsequently with the McGuire Manufacturing Company, Peckham Motor Truck & Wheel Company and the Niles Car & Manufacturing Company, of which he became sales manager. During the latter years of his life he devoted his attention particularly to railway appraisal work, for which his long experience in car and truck sales particularly fitted him.

Frank Samuelson, Jr.

Frank Samuelson, Jr., auditor of the Interborough Rapid Transit Company in New York City, died on Oct. 19 of pernicious anemia after a long illness. He was 61 years old.

Born in New York, Mr. Samuelson attended Kearny High School and New York University. After becoming a certified public accountant, he was associated for a time with the New York accounting firm of Haskins & Sells, and later was auditor for the Metropolitan Street Railway, New York.

About twenty years ago Mr. Samuelson became auditor for the New York Railways, then an affiliate of the Interborough, and eight years ago became auditor of the latter.

E. M. Beeler

Edwin Mead Beeler, brother of John A. Beeler, an associate of the Beeler Organization, New York, died at his home in Scarsdale, N. Y., on Oct. 18. He is survived by his widow and two children.

Mr. Beeler was born in Cincinnati, Ohio, on July 2, 1871. He went to Denver, Col., in 1893, where he was employed successively in the transportation and engineering departments of the Denver Tramway for more than ten years. Later he was connected with the city engineer's office and the Board of Public Works of the city of Denver for a number of years. He was associated with the Beeler Organization, engineers and consultants, for the past ten years. By his unassuming and genial manners, Mr. Beeler won a host of friends in Denver and New York. He had been ill for several months.

C. O. Sullivan

C. O. Sullivan, of Lima, Ohio, traffic manager of the Western Ohio Railway & Power Company, who has been affiliated with the electric railway industry for about 25 years, died on Oct. 15. Mr. Sullivan was very active in the affairs of the various associations affiliated with electric railways.

Mr. Sullivan began his railroad career with steam lines in the Southwest at an early age. After several years in the Southwest he became affiliated with the Big Four Railroad system, and located at Wabash, Ind., where he remained for about eight years. At this time the electric railways were coming into prominence, and he decided to cast his lot with this new and promising enterprise, accepting a position with the Winona Interurban Railway, Warsaw, Ind., as traffic manager. This position he filled for about four years. About



C. O. Sullivan

this time the electric railways in Ohio were making rapid progress and as offering greater opportunity to him, Mr. Sullivan severed his connection with the Winona Interurban Railway in 1911 to join the Western Ohio Railway as traffic manager, in which capacity he remained until his death.

Mr. Sullivan was one of the pioneers in establishing interurban freight service throughout Ohio, Indiana, and Michigan. Since he was always optimistic of a great future for the service he was undertaking to establish, the electric railway industry loses by his death one of its staunch supporters.

Mr. Sullivan was born at Wabash, Ind., on July 29, 1869.

James H. Griffin

James Harold Griffin, one of the pioneer workers of the electric railway industry in Kansas City, died there recently. Mr. Griffin was a notable character in the street railway industry, having been closely associated with the transportation field since the days of the mule cars. He had served as mechanic, superintendent, chief of instruction and inspector under various administrations of the affairs of the business in Kansas City. At the time of his death, having served some 44 years in the business, he was still active in the instruction of operators.

INDUSTRY MARKET AND TRADE NEWS

\$14,154,000 Car Contract Awarded in New York

The Board of Transportation of New York City has awarded a \$10,531,500 contract to the American Car & Foundry Company, the lowest of five bidders, for 500 new steel cars to be used on the Bronx, Brooklyn and Long Island City sections of the new city subway system.

The Board has also awarded a \$2,392,500 contract to the General Electric Company for motors, and the Westinghouse Electric & Manufacturing Company received a \$1,300,000 contract for control equipment.

The combined contracts total \$14,154,000, or \$28,308 per car, which is \$8,991 less than the cost per car of the 300 now being put through service tests on the new Eighth Avenue-Washington Heights subway line.

Block signaling and safety equipment for the Bronx line is to be supplied by the General Railway Signal Company under a \$2,317,800 contract.

Brooklyn Bus Corporation Orders 50 Mack Buses

The Brooklyn Bus Corporation has placed an order for 50 Mack street car type buses for an amount in excess of \$500,000. Production of these vehicles has already been started. The new buses will be among the largest single-deck motor buses in operation in the country, having a seating capacity of 44 passengers.

Entrance is at the front and exit in the center, the doors being 46 in. wide. Street car type leather seats accommodate two passengers to a seat and are placed crosswise. Distinctive features of the new buses include power steering and the use of rubber fenders. Full driver vision to all entrance and exit spaces is made possible by the latest type of rear-vision mirror.

General Electric Earnings \$30,753,850

The General Electric Company announced that its net profit available for dividends on the common stock during the first nine months of this year was \$30,753,850, equivalent to \$1.07 a share on 28,845,927 shares outstanding. This compares with a net profit of \$42,518,708, or \$1.47 a share, in the corresponding period of last year. The quarterly dividend on the stock is 40 cents a share. The net profit in the third quarter was equivalent to 32 cents a share, compared with 37 cents in the second quarter and 45 cents in the third quarter of last year.

Orders received by the company in the first nine months of this year amounted to \$202,700,016, compared with \$267,651,832 for the corresponding period of last year, Gerard Swope, presi-

dent of the company, announced. Sales billed for the nine months of this year totaled \$206,138,967, compared with \$287,886,541 for the corresponding period of last year.

F. J. Griffiths with Timken

F. J. Griffiths has joined the Timken organization at Canton, Ohio, as director and president of the Timken Steel & Tube Company. M. T. Lothrop, president of the Timken Roller Bearing Company, has been made chairman of the board of the Timken Steel & Tube Company.

Mr. Griffiths has a broad understanding of the present problems of the steel industry, with which he has been prominently identified for 30 years. Until recently he was associated with the Republic Steel Corporation as president of the Republic Research Corporation. Mr. Griffiths began his career in the steel industry with the United Steel Company at Canton. Later he helped to organize the Central Steel Company in Massillon, Ohio, of which he was president and general manager. When these two companies were merged to form the Central Alloy Steel Company, he was chosen chairman of the board, which office he held until the Central Alloy merger with Republic.

Roscoe Seybold Appointed Westinghouse Comptroller

Roscoe Seybold has been advanced by the Westinghouse Electric & Manufacturing Company to the position of comptroller from the post of assistant to the president. A native of Rockville, Ind., and a graduate of Purdue University, he joined the Westinghouse organization in 1907 as a graduate student. After completing this training course, he entered the price department, where he remained until 1926. From 1909 until 1922 he was manager of the price section of the power and railway headquarters sales departments. From 1922 until 1926 he served in an executive capacity with the general sales manager. He has been assistant to President F. A. Merrick since 1926.

Philadelphia Awards Contract To Union Switch & Signal

The city of Philadelphia, through the Department of City Transit, has contracted with the Union Switch & Signal Company for the complete installation of automatic block signals, electro-pneumatic train stops and interlockings, with centralized traffic control of all switches and signals on the Ridge Avenue extension of the Broad Street subway, and the consolidation of the Spring Garden and Girard Avenue electro-pneumatic interlockings. The work involves the installation of a 67-lever electro-pneumatic interlocking with a centralized traffic control machine.

Order for Insulators to Westinghouse

Westinghouse Electric & Manufacturing Company has received an order from the Pennsylvania Railroad for porcelain insulators to be used to suspend the high tension lines for the new electrification work now being continued toward Washington from Wilmington. The order will result in additional employment at Westinghouse factory at Derry, Pa., as well as in employment for suppliers of the raw material, including clay, feldspar and flint.

Yellow Coach Reports Net Loss for Nine Months

Yellow Truck & Coach Manufacturing Company reported net loss after provision for depreciation amounting to \$1,893,352 for the nine months ended Sept. 30, 1931. In the similar period a year ago the company had a net profit amounting to \$1,053,431.

Net sales for the first nine months of this year totaled \$20,659,471.

The net loss for the quarter ended Sept. 30, 1931, amounted to \$846,471. This compared with a net loss of \$384,432 for the third quarter of 1930.

Prof. Dudley Returns to Westinghouse Air Brake

Prof. S. W. Dudley, Strathcona professor of mechanical engineering and chairman of the department of mechanical engineering in Yale University, has rejoined the engineering organization of the Westinghouse Air Brake Company in an advisory capacity, with the title of assistant to the vice-president, while retaining his university connections.

After completion of his college course in mechanical engineering at Yale University and serving for a short period on the faculty, Prof. Dudley entered the employ of the Westinghouse Air Brake Company as special apprentice in 1905 and advanced rapidly through many important positions until he was appointed chief engineer in 1914. That position he retained until 1921, when he was induced to accept the chair of mechanical engineering in his alma mater. Many outstanding air-brake developments mark the period during which he was associated with this company, and in these achievements he had a prominent part.

Because of his broad experience, pleasing personality and keen insight into human affairs and his extensive knowledge of engineering practices, Prof. Dudley has been in demand for various activities and positions of responsibility with the college. He is a member of the board of trustees and governing board of Sheffield Scientific School, chairman of the university committee on transportation, member of the industrial committee of the Institute of Human Relations in Yale, and member of the committee on relations between railroads and colleges of the Society for the Promotion of Engineering Education.

Trade Notes

C. H. Will Motors Corporation, Minneapolis, Minn., has filed an amendment to its incorporation articles changing its name to Greyhound Motors & Supply Company.

Harry L. Erlicher has been appointed purchasing agent of the General Electric Company, succeeding L. G. Bunker, who retired on Oct. 1. In his new position Mr. Erlicher will direct purchases of materials aggregating more than \$100,000,000 a year.

J. M. McKibben, Jr., has been appointed sales promotion and advertising manager of the newly organized industrial department of the Westinghouse Electric & Manufacturing Company.

Ohmer Fare Register Company has announced the appointment of J. B. Wallis as manager of its Eastern district, with headquarters in New York City. Mr. Wallis was formerly southeastern district sales manager for the Remington Cash Register Company.

E. R. Dougherty has joined the sales organization of the American Manganese Steel Company. He will work with E. F. Mitchell, district manager, in the engineering and sale of Fahrallloy castings in Chicago and the surrounding territory.

The American Manganese Steel Company has moved its Chicago office to the

McCormick Building, 332 South Michigan Avenue, where it is located with the parent company, the American Brake Shoe & Foundry Company.

Bus Deliveries

Boston Elevated Railway, Boston, Mass., ten A.C.F., 40-passenger, Metropolitan type.

Brooklyn Bus Corporation, Brooklyn, N. Y., 41 Twin Coach; one Model 40, and 40 Model 30.

Connecticut Company, New Haven, Conn., six Yellow Coach, 29-passenger, Type V.

Denver Tramways, Denver, Col., two Yellow Coach, 21-passenger, Type U.

Grand Forks Street Railway, Grand Forks, N. D., one Mack, Model BG.

Highway King Buses, Ltd., Hamilton, Ont., eleven White, Model 54.

Madison Railways, Madison, Wis., one Yellow Coach, 21-passenger, Type W.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., five Yellow Coach, 21-passenger, Type U.

United Traction Company, Albany, N. Y., seven Twin Coach; four Model 40, and three Model 30.

Virginia Electric & Power Company, Norfolk, Va., 25 White, Model 65A.

Conspectus of Indexes for October, 1931

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Lateet	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares*					
1913 = 4.84	Oct., 1931 7.85	Sept., 1931 7.81	Oct., 1930 7.79	Oct., 1931 7.85	Oct., 1926 7.37
Electric Railway Materials*					
1913 = 100	Oct., 1931 116	Sept., 1931 116	Oct., 1930 133	Dec., 1926 159	Aug., 1931 113
Electric Railway Wages*					
1913 = 100	Oct., 1931 231.9	Sept., 1931 232.9	Oct., 1930 231.8	April, 1931 233.2	Oct., 1926 226.2
Electric Ry. Construction Cost*					
Am. Elec. Ry. Assn. 1913 = 100	Oct., 1931 165	Sept., 1931 167	Oct., 1930 195	Nov., 1928 206	Oct., 1931 165
General Construction Cost					
Eng'g News-Record 1913 = 100	Oct., 1931 169.8	Sept., 1931 171.4	Oct., 1930 198.7	Jan., 1927 211.5	Oct., 1931 169.8
Wholesale Commodities					
U. S. Bur. Lab. Stat. 1926 = 100	Sept., 1931 69.1	Aug., 1931 70.2	Sept., 1930 84.2	Sept., 1928 100.1	Sept., 1931 69.1
Wholesale Commodities					
Bradstreet 1913 = 9.21	Oct., 1931 8.30	Sept., 1931 8.49	Oct., 1930 10.30	Jan., 1928 13.57	Oct., 1931 8.30
Retail Food					
U. S. Bur. Lab. Stat. 1913 = 100	Sept., 1931 119.4	Aug., 1931 119.7	Sept., 1930 145.6	Dec., 1926 161.8	June, 1931 118.3
Cost of Living					
Nat. Ind. Conf. Bd. 1923 = 100	Aug., 1931 85.9	July, 1931 85.9	Aug., 1930 94.7	Nov., 1926 104.0	June, 1931 85.9
General Business					
The Business Week Normal = 100	Oct. 3, 1931 71.4	Sept. 5, 1931 72.2	Oct. 4, 1930 86.6	Oct. 6, 1928 117.6	Aug. 29, 1931 71.0
Industrial Activity					
Elec. World, kw.-hr. used 1923-25 = 100	Sept., 1931 100.4	Aug., 1931 97.3	Sept., 1930 110.7	Feb., 1929 140.4	Aug., 1931 97.3
Bank Clearings					
Outside N. Y. City 1926 = 100	Sept., 1931 63.4	Aug., 1931 66.0	Sept., 1930 82.7	Oct., 1929 111.8	Sept., 1931 63.4

*The four index numbers marked with an asterisk are computed by Mr. Richey. Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation

and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 115 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

†Revised.

Material Prices

OCTOBER 27, 1931

Metals—New York

Copper, electrolytic, delivered, cents per lb.	7.00
Lead.....	3.77
Nickel, ingot.....	35.00
Zinc.....	3.60
Tin, Straits.....	22.20
Aluminum, 98 to 99 per cent.....	22.90
Babbitt metal, warehouse	
Commercial grade.....	34.75
General service.....	29.00

Track Materials—Pittsburgh

Standard steel rails, gross ton.....	\$43.00
Track spikes, $\frac{1}{2}$ -in. and larger, per 100 lb.....	\$2.70
Tie plates, steel, cents per 100 lb.....	1.85
Angle bars, cents per 100 lb.....	2.75
Track bolts, per 100 lb.....	3.90
Ties, 6m x 8m x 8 ft.,	
White Oak, Chicago.....	1.05
Long leaf pine, New York.....	1.00

Waste—New York

Waste, wool, cents per lb.....	11.00
Waste, cotton (100 lb. bale), cents per lb.:	
White.....	6.50-9.00
Colored.....	5.50-8.00

Wire—New York

Bar copper wire, cents per lb.....	9.00
Rubber-covered wire, No. 14, per 1,000 ft.....	\$3.75
Weatherproof wire base, cents per lb.....	11.00

Paint Materials—New York

Linseed oil (5 bbl. lots), cents per lb.....	8.20
White lead in oil (100 lb. kag), cents per lb.....	13.25
Red lead in oil.....	14.75
Turpentine (bbl. lots), cents per gal.....	38.00
Putty, com'l grade, 100 lb. tubs, cents per lb.....	5.50

Hardware—Pittsburgh

Wire nails, per kg.....	\$1.90
Sheet iron (24 gage), cents per lb.....	2.40
Sheet iron, galvanized (24 gage), cents per lb.....	2.90
Auto body sheets (20 gage), cents per lb.....	3.10
Fender stock (20 gage), cents per lb.....	3.20

Bituminous Coal

Pittsburgh mine run, net ton.....	\$1.30
Central Ill. screenings.....	1.00
Kansas screenings, Kansas City.....	1.00
Big seam, Ala., mine run.....	1.45
Smokeless mine run, Chicago.....	1.90

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand.....	\$120.00
Wood block paving $\frac{3}{4}$, 16 lb. treatment, N.Y., per sq.yd., f.o.b.....	2.00
Paving brick, $\frac{3}{4} \times 8 \frac{1}{2} \times 4$, N.Y., per 1,000 in. carload lots, f.o.b.....	50.00
Paving brick, $\frac{3}{4} \times 8 \frac{1}{2} \times 4$, N.Y., per 1,000 in. carload lots, f.o.b.....	45.00
Crushed stone, $\frac{1}{2}$ -in., N.Y., wholesale, f.o.b. per cu.yd.....	1.80
Cement, Chicago, in carload lots, without bags, delivered.....	1.95
Gravel, $\frac{1}{2}$ -in., $\frac{1}{2}$ cu.yd., wholesale, f.o.b.....	1.60
Sand, cu.yd., wholesale, f.o.b.....	1.00
Asphalt, in pkg. N.Y., f.o.b. ref., per ton.....	16.00

Scrap—New York

Heavy copper, cents per lb.....	4.90
Light copper.....	4.15
Heavy brass.....	2.60
Zinc.....	1.50
Lead, heavy.....	2.50
Mixed babbitt.....	3.00
Battery lead plates.....	0.85
Cast aluminum.....	4.75
Sheet aluminum.....	8.25
Auto radiators.....	2.85
Tires, standard, mixed, per ton.....	\$3.00
Inner tubes, mixed, per cwt.....	\$1.20

Old Material—Chicago

Steel car axles, net ton.....	\$11.25
Cast iron car wheels, gross ton.....	9.25
Steel car wheels, gross ton.....	9.00
Leaf springs, cut apart, gross ton.....	9.75
Angle bars, gross ton.....	8.75
Brake shoes, net ton.....	6.00
Steel rails (short), gross ton.....	10.75
Relaying rails, gross ton (65 lb. and heavier)	24.50
Machine shop turnings, gross ton.....	4.25
Coil springs, per gross ton.....	10.00
Frogs, switches and guards cut apart, per gross ton	8.00

Accident Insurance or Accident prevention?

▼

INSURANCE PAYS FOR THE ACCIDENT



BUT PEACOCK STAFFLESS BRAKES
PREVENT IT!

Peacock Brakes are
powerful, fast, safe and absolutely
CERTAIN

National Brake Company

890 Ellicott Square, Buffalo, N. Y.

Canada:—Lyman Tube & Supply Co., Ltd., Montreal

The Elcon Co., General Sales Representative, 50 Church Street, New York City

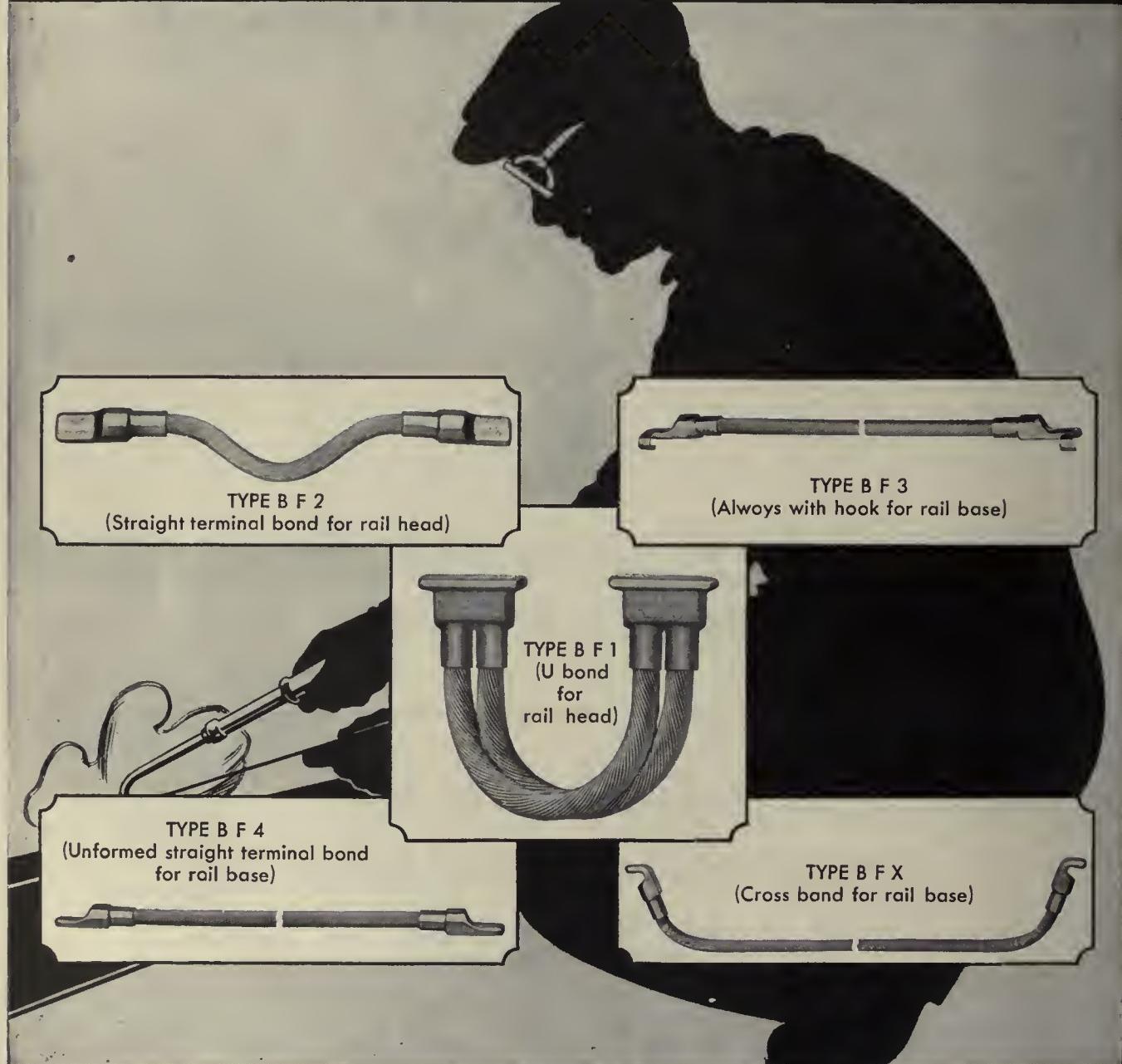
TIGER WELD

FLASH BUTT-WELDED

POWER BONDS

THIS latest and most significant advance in power bond design assures welding simplicity and economy never before realized—as well as higher resistance to vibratory stresses. By newly developed manufacturing methods, the wires are intimately flash butt-welded to solid soft steel terminals, making it easy for any welder to give you better installations at lower cost. Five types—adaptable to flame or arc welding—each bond stretch-tested to insure positive unity. Full particulars and samples on request. Address the nearest office.

A TRIUMPH IN PERFORMANCE AND ECONOMY



1831



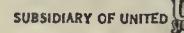
1931

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

SUBSIDIARY OF UNITED STATES STEEL CORPORATION



And All Principal Cities
Export Distributors: United States Steel Products Company, New York



*The Charles A. Coffin Medal
Won by The Milwaukee Electric
Railway & Light Company*

For Distinguished Service!

Two First Awards for Development and Efficiency Won by Systems Equipped with Goodyear All-Weather Tread Tires

The 1931 winners of two most coveted national awards—the Charles A. Coffin Medal for Distinguished Contribution to the Development of Electric Transportation, and the Bus Transportation Maintenance First Award in Class B City Operation—both rely on Goodyear Bus Tires.

The Milwaukee Electric Railway and Light Company, operating 169 buses over 887 miles of route, receives the Charles A. Coffin Medal as a signal citation for advances which promote public convenience and redound to the benefit of the industry. Most of its motor coaches are equipped with Goodyear Bus Tires.

The Capital Traction Company, of Washington, D. C., is awarded first place in its metropolitan

class for efficient maintenance methods and practices. Capital operates 47 buses, all for the last several years equipped with Goodyear Tires.

"Our tire record," says Capital



*Bus Transportation First Award,
Class B City Operation. Won
by Capital Traction Company,
Washington, D. C.*

Traction in its brief on operations, "is entirely due to the manufacturer... a record of over 100,000 miles operated per tire failure delay. Practically our entire fleet is equipped with balloon tires, with a consequent easier riding for the passengers and ease on the bus."

Goodyear extends congratulations to the victors, and pledges the same character of manufacturing interest and tire quality to every user of Goodyear Bus Balloon Tires.

THE GREATEST NAME IN RUBBER

GOOD^YEAR

IT PAYS TO SPECIFY GOODYEARS WHEN YOU ORDER NEW COACHES

Lubrication costs have been lowered. The maintenance dollar covers more ground than it ever did before. Railway executives have discovered a new system of lubrication. Car buyers are specifying it for new equipment. Many of the most successfully operated lines in the country are completely equipped.

This new system—the Texaco System of Car Journal Lubrication—offers definite operating economies. No one can predict the exact amount it will save on your lines, but Texaco engineers can promise you that it will be substantial.

Texaco Lovis Oil, a revolutionary new lubricant, and the Texaco Car Journal Oil Seals are the essential elements. Bearing and journal wear are cut down, power consumption is less and shop time for lubrication and maintenance lower than was ever possible under the older methods.

Records of actual experiences on well known electric railways are available on request. Find out what has been done, then make the test on your own cars. Texaco engineers will freely cooperate. Write The Texas Company today.

THE TEXAS COMPANY, 135 E. 42nd ST., NEW YORK CITY

TEXACO
LUBRICANTS



Like finding money



“STANDARD ‘QT’” WHEELS



“Standard” Quenched and Tempered Wheels have demonstrated in severe service superior structural strength and wear life. Scientific heat treatment is responsible for the super-service of “QT” wheels. Use them on your service to get maximum safety and minimum operating costs.

STANDARD STEEL WORKS COMPANY

GENERAL OFFICES & WORKS: BURNHAM, PA.

NEW YORK
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ST. LOUIS

PORTLAND
SAN FRANCISCO

AKRON



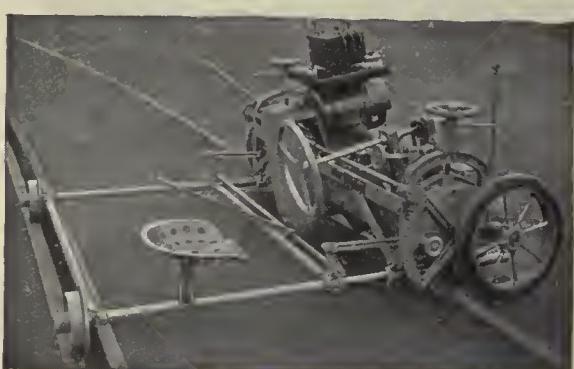
Reciprocating Track Grinder



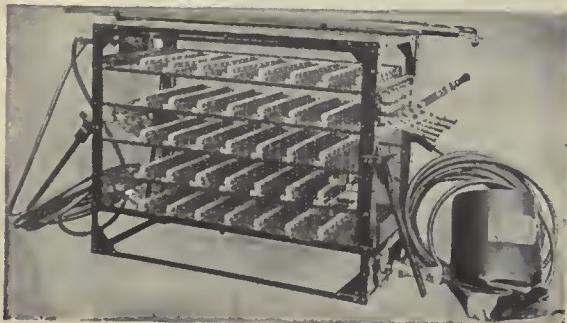
Vulcan Rail Grinder



Eureka Radial Rail Grinder



Improved Atlas Rail Grinder



Ajax Electric Arc Welder

Bestir or be stirred

"WE must bestir ourselves to hold our patronage by giving to our passengers the closest approximation we can to the comfort they enjoy in riding on rubber . . .

"It is of the utmost importance, therefore, that the electric street car be provided with the smoothest and best type of roadbed . . ."

The words are those of Mr. W. W. Wysor. Need we add even a word?

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

AGENTS

Chester F. Gallor, 50 Church St., New York
 Chas. N. Wood Co., Boston
 H. F. McDermott, 208 S. La Salle St., Chicago
 F. F. Boiler, San Francisco, Cal.
 H. E. Burns Co., Pittsburgh, Pa.
 Equipment & Engineering Co., London
 Railway & Welding Supply Company, Toronto, Ontario

How Much Should A Wheel Weigh



ENOUGH metal must be put in a car wheel to give adequate strength and wear resistance. How much of it is necessary to fulfill these conditions depends upon the kind of metal used. By reason of its special heat-treated composition the Davis "One-Wear" Steel Wheel can secure a given result with a minimum weight. It's the special metal that makes the difference.

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST. LOUIS

HEADQUARTERS FOR SPRAY-PAINTING and FINISHING



EQUIPMENT

for

Electric Railways

Winter slows up exterior maintenance work, and at the same time it is the hardest season on exterior structures. Winter maintenance problems on electric railways however, are solved by DeVilbiss Spray-finishing and Spray-painting Equipment, because it is so fast that you can take advantage of the short periods of "open weather" to accomplish a large volume of this type of work.

The spray method with DeVilbiss Equipment is three to five times faster than brush painting methods. One man, or a small crew, can paint a job and finish it in a space of time which would be impossible with brush methods. With the proper DeVilbiss Equipment to meet your needs, there is no longer any reason why outside works should deteriorate and suffer from lack of painting in the winter time.

Electric railway executives should send for Catalog "RB". It shows why DeVilbiss Equipment is almost universally used on the electric railways of the country.

THE DeVILBISS COMPANY : TOLEDO : OHIO

New York Philadelphia Cleveland Detroit Chicago St. Louis
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Direct sales and service representatives available everywhere

DeVilbiss



Maintenance award
winners use
Yellow Coaches



THE fact that Yellow Coaches overwhelmingly predominate on three out of four of the winning properties for the Bus Transportation Maintenance Awards, again conclusively establishes the superior excellence of Yellow equipment.

Out of a total fleet of 89 coaches used by Blue & Gray—76 were Yellows—almost 100 per cent. Out of a total fleet of 57 coaches used by Capital Traction—31 were Yellows. And in Toledo Yellow Coaches predominate with Community Traction.



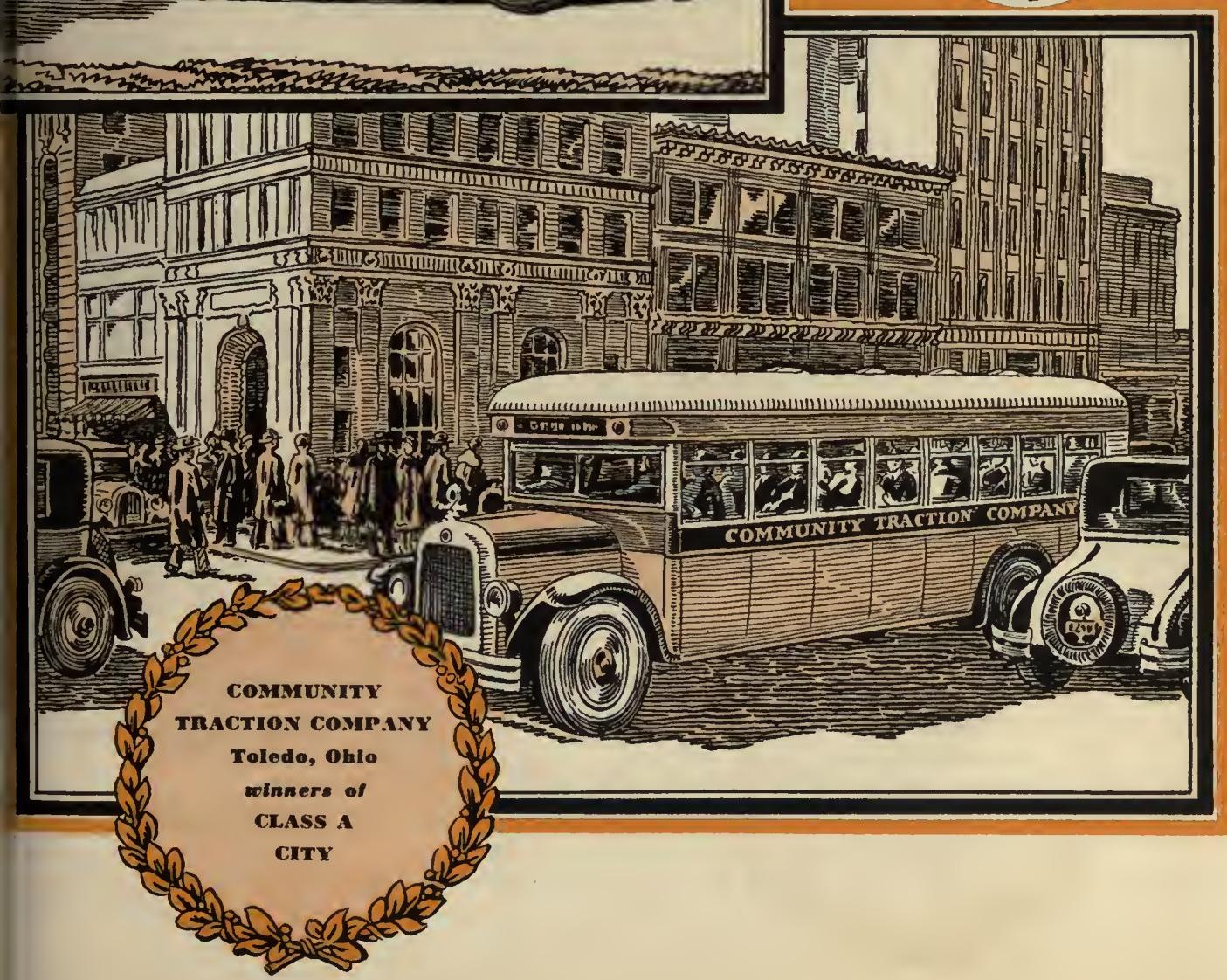
BLUE
and GRAY
TRANSIT COMPANY
Charleston, W. Va.
winners of
CLASS A
INTER-CITY



CAPITAL
TRACTION COMPANY
Washington, D. C.
winners of
CLASS B
CITY



*In inter-city service and
in city service Yellow
Coaches can always be
depended upon to give
uniformly reliable serv-
ice at low cost.*



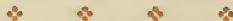
COMMUNITY
TRACTION COMPANY
Toledo, Ohio
winners of
CLASS A
CITY

Thank you mr. Hill

"NNATURALLY," said Mr. Hill, Association President and head of The Blue & Gray Transit Company, winners of the Class A Bus Transportation Maintenance Award for inter-city operation, "good equipment has proved a very important factor in helping keep our maintenance costs low.

"However, our most valuable discovery was the manner in which new equipment invariably increased riding. Our lines on which new equipment was introduced this year showed decided increases in revenue. While we found that old equipment will often maintain regular riding, we learned that new motor coaches are a big asset in attracting additional riders and a higher class of patronage—especially women.

"Modern, new equipment makes all the difference in the world when it comes to building for increased revenue."



These statements, so kindly and decisively offered by so well recognized an authority, are truly significant. Yellow Coaches, because of design and outstanding performance, yield the results outlined so clearly and experienced by Mr. Hill.

It can be done -- with
Yellow Coaches

GENERAL MOTORS TRUCK CO., Pontiac, Mich

Subsidiary of Yellow Truck & Coach Mfg. Co.



These Combustion Engineers have cut fuel costs for many operators.

HOW much would a 17% increase in motor fuel mileage save you in a year? How much would it be worth to you to reduce obnoxious odors in your motor coaches? And wouldn't you like to receive better lubrication from motor oil?

These are some of the problems which motor coach combustion engineers of the Standard Oil Company (Indiana) are solving for Midwestern motor coach operators. The efficiency of hundreds of motor coaches has been greatly increased by these engineers . . . and as the operating efficiency was increased the motor fuel cost and the amount of obnoxious combustion odors released were

decreased. A check taken of twenty-five of these motor coaches picked at random from different companies shows an average saving of 17% in motor fuel mileage and 42% less carbon monoxide.

It may be also possible to improve your gasoline mileage and lower motor fuel costs. Your motor coaches serviced by Standard Oil Company (Indiana) combustion engineers and using Red Crown Gasoline and Polarine Motor Oil will be as efficient and economical as perfect gasoline and motor oil performance can make them. Call in one of these motor coach engineers. His investigation places you under no obligation.

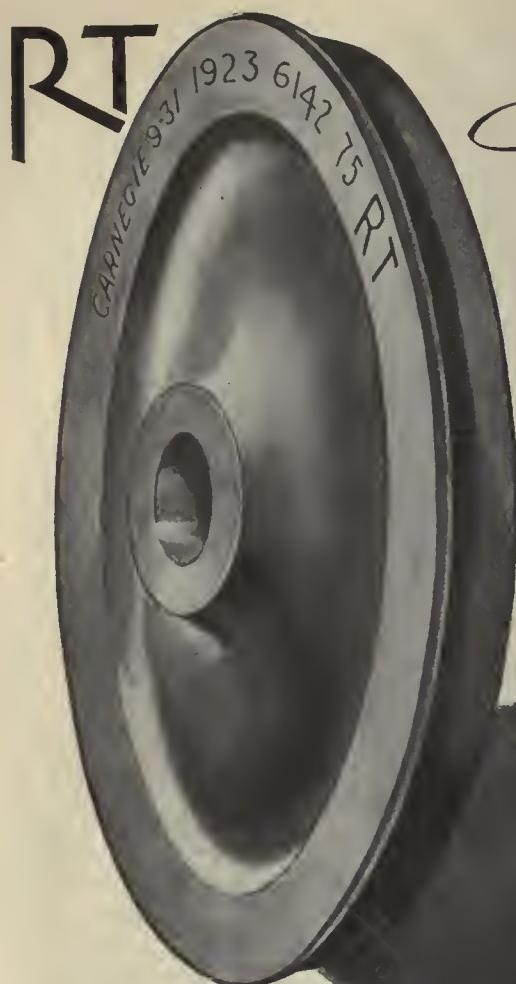
STANDARD OIL COMPANY
(Indiana)
910 So. Michigan Avenue

1208-B

Chicago, Illinois



MATCHED TO GIVE PERFECT PERFORMANCE



And now
**NEW WHEEL
SATISFACTION**



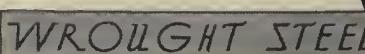
Stamped on Carnegie Wrought Steel Wheels, the initials "RT" (Rim Toughened) identify wheels particularly adapted to modern heavy duty service. These initials indicate the additional refinement of heat treatment, the process of which produces a wheel with an especially tough rim and with high physical properties . . . a wheel that will give you greatly increased service because it has the extra stamina to endure the stress and strain of modern traffic conditions.

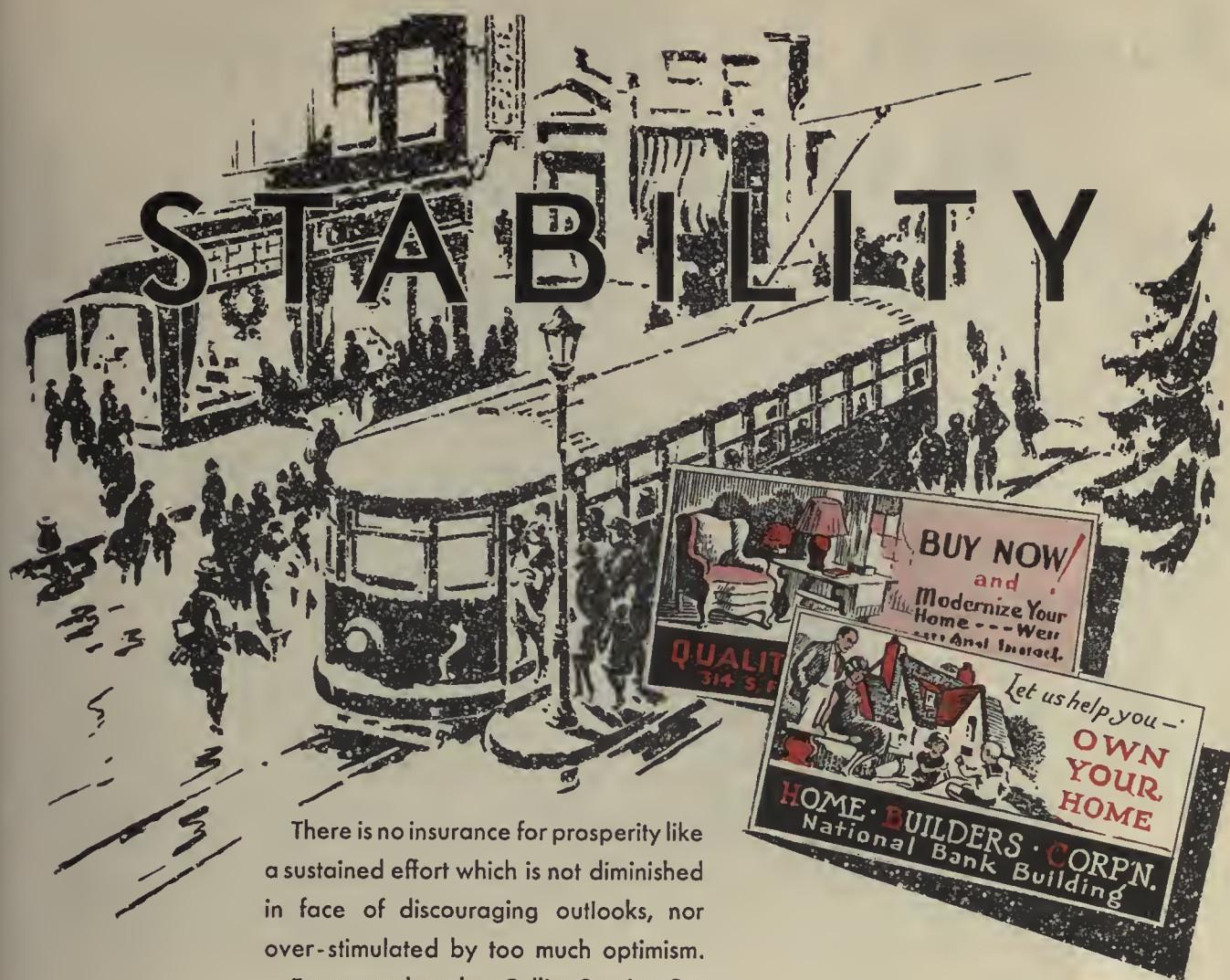
You already know the outstanding advantages of Wrought Steel. Learn now of this further improvement. Let our wheel engineers bring you complete details. Carnegie Rim Toughened Wrought Steel Wheels have created a new standard of service and value . . . have brought to users a new wheel satisfaction.

CARNEGIE STEEL COMPANY ♠ PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

U.S.
STEEL

CARNEGIE  **WHEELS**



There is no insurance for prosperity like a sustained effort which is not diminished in face of discouraging outlooks, nor over-stimulated by too much optimism.

For many decades, Collier Service Car Cards have kept steadily at it, urging riders to buy. Rain or shine they have been promoting business and so helping to maintain traffic. Better still, they have been a source of income on which the Electric Railway Operating Companies have been able to rely.

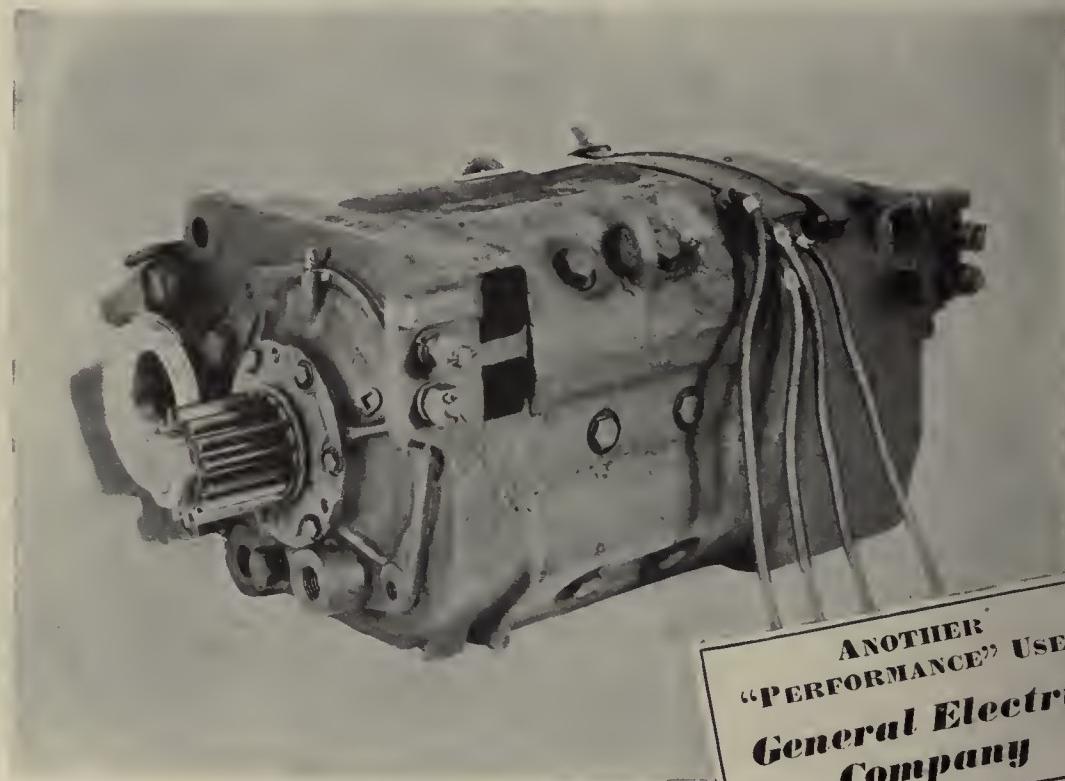
**CAR CARD ADVERTISING
ALMOST EVERYWHERE**

BARRON G. COLLIER

INCORPORATED
220 W. 42nd ST., N.Y.C.



LOWEST COST PER CAR MILE WITH LESS MAINTENANCE



WHERE PERFORMANCE TAKES PREFERENCE OVER PRICE

Hand in hand go operating economies and public approval when street railway equipment is modernized. On new or old rolling stock **SKF** Bearings are a step in the right direction. Especially is this true of traction motors. It is here that **SKF** Performance Takes Preference Over Price.

On the General Electric #712

You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that cost so little.

D. C. Street Car Motor **SKF**'s on each end of the armature shaft are a decisive factor in maintaining the original efficiency plus freedom from electrical troubles due to bearing wear. **SKF**'s never require adjustments and have a wide margin of reserve stamina to insure uninterrupted schedules at lowest cost per car mile.



2796

SKF INDUSTRIES, INC. 40 EAST 34th STREET, NEW YORK, N. Y.

SKF

Ball and Roller Bearings

120,000 MILES

per EXIDE

11,000,000 MILES

per YEAR

... and not one battery plate renewal

EXIDES GIVE LOWEST

COST PER BUS MILE



One of the 185 modern buses of the Northland Greyhound Lines which have used Exide Batteries as standard since their organization.



Here is a typical Exide Motor Coach Battery that assures economy to any operator. Batteries that can average 120,000 miles without a plate renewal are worth looking up, don't you think?

Exide
MOTOR COACH
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto

SOUNDS like a record. Maybe it is. There's one thing certain—"Exides give lowest cost per bus mile" is being proved every day, by hundreds of bus companies, large and small. This time by the Northland Transportation Company (Northland Greyhound Lines) of Minneapolis, Minn. 120,000 miles—24 months—has been the *average* life this company has obtained from Exide Motor Coach Batteries . . . and without plate renewals.

It's the built-in dependability, uniform rugged construction, that makes Exide Batteries cost least per mile. There are no weak spots in an Exide . . . rebuilding is not necessary. An Exide is in your bus till it wears out, and gives you reliable performance all the way.

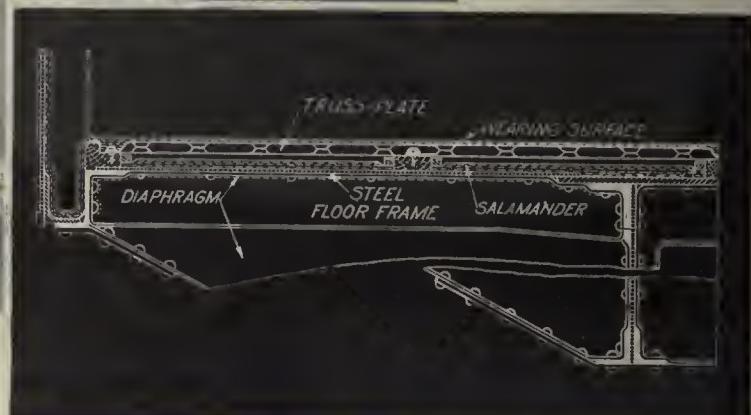
Of course you want to keep maintenance figures from getting too big. The question is, "How?" Use Exide Motor Coach Batteries and our extensive engineering experience which enables us to show you how to get lowest cost per bus mile. Don't hesitate to make your problem ours. We want to serve you as well as sell batteries. Write today for facts. No obligation.

15 years without repair . . .



Subway car in use on the Interborough Rapid Transit System, New York. The J-M Truss Plate steel car flooring has been in service since 1916 without any repairs.

J-M Truss Plate has the advantage of light weight—great strength and stiffness—easy application to car frame—high thermal resistance—low maintenance cost.



J-M Truss Plate steel car floor-

ing has perfect record on Interborough Rapid Transit Test

J-M "Type A" Tile Flooring is a finished decorative flooring that is waterproof, resilient, acid proof and will outlast any other resilient type of floor covering. It is available in 9 different colors and several sizes and shapes.



IN 1916 the Interborough Rapid Transit System in New York City placed in operation the first car equipped with J-M Truss Plate steel car flooring. For fifteen years this car has been subjected to the heaviest passenger traffic in the world—and not one cent has been spent on the sub-flooring for repair. Today, hundreds of units have been installed in the subway cars of New York City.

J-M Truss Plate can be adapted to any type of underframe—it will give you the same satisfactory results on your equipment that the Interborough Rapid Transit System has experienced. Address Johns-Manville, 292 Madison Ave., New York.

Johns-Manville



Service to Transportation

Suburban Cars for Electric Steam Road Service....

weigh 13,140 lbs. less

"ALUMINIZED"

Power savings alone will absorb
the extra cost in 39 months , ,

"ALUMINIZED," the average suburban car for electric steam road service can weigh 112,000 lbs. instead of the usual 125,140 lbs. "Aluminized" cars have equal strength and are over 6 1/2 tons lighter. 8,650 lbs. of the light strong alloys of Alcoa Aluminum displace 24,100 lbs. of steel. Result, the "aluminized" car, lifting 525,600 ton-miles a year off your tracks, cuts power costs, wear and tear on motors, brakes, etc.

The additional cost of "aluminizing" suburban cars for electric steam road service is absorbed in 39 months by savings in power costs alone. Based on a cost of .067 cents per 1,000 lbs. of car per mile, it costs 8.38 cents to move the old fashioned (125,140 lbs.) car 1 mile. The "aluminized" car weighing only 112,000 lbs. costs 7.50 cents per mile. Operating the usual 86,000 miles per year of suburban cars for electric steam road service, this power saving of .88 cents per mile by the "aluminized" car results in a power saving of \$704 per year.

When you "aluminize" you can use the light strong alloys of Alcoa Aluminum for under frame, including body bolsters, side sills, cross members and apparatus supports. Use it too for all metal work in the body, including side plates, end plates, roofs and finish inside and outside. It can also be used for numerous truck, motor and apparatus parts.

Standard structural shapes of the light strong alloys of Alcoa Aluminum from which street cars and railway coaches are made are carried in stock. Plates, rivets, bolts and screws are also available.

The engineering handbook, "Structural Aluminum," is available at \$1.00 a copy. Address ALUMINUM COMPANY of AMERICA; 2463 Oliver Building, PITTSBURGH, PENNSYLVANIA.



REG. U. S. PAT. OFF.

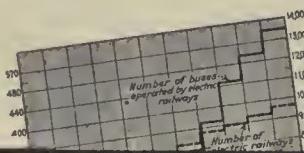
ALCOA ALUMINUM

out
JAN. 2ND

ANNUAL PROGRESS AND STATISTICAL NUMBER

Bus Service and
Equipment Increased

By
J. R. STAUFFER
Assistant Editor
Electric Railway Journal



More than 1,600 new buses bought during past year. Route extensions were over 5,000 miles. Bus service is now being given by 390 electric railway companies operating 13,522 vehicles on 26,098.63 miles of route.

The total number of buses purchased by 171 companies during 1930 was 1,768, of which 1,614 were new vehicles and 154 were bought second hand. A number of the latter were acquired with the absorption of lines purchased from independent operators. At the same time there were approximately 750 buses disposed of by scrapping. The average age of those scrapped vehicles was 12 years. The net gain for the year in

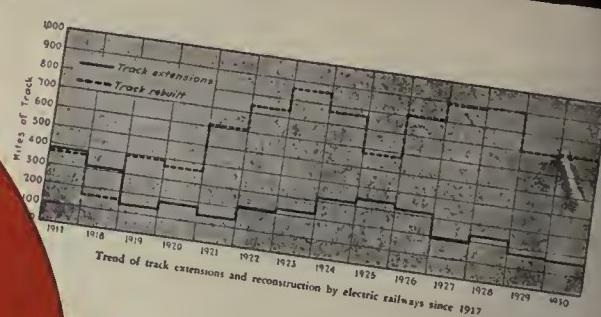
A RELIABLE, up-to-date picture of what's been happening in the community transportation field—surface, subway and elevated railways, electrified railroad lines, taxis, buses, trolley buses, freight lines and terminals.*

Transportation men in all departments of operation will wish to study the factual information

in this Statistical Number and to keep it handy for reference throughout the coming year. It is the one reliable source of complete information covering every phase of the industry—a master tabulation, describing and comparing the last year's operations with previous years, and indicating the trends for 1932.

* TO ADVERTISERS: Sales plans and market studies should be built around this conception of the community transportation field.

Advertising Forms Close December 21!



*Track Activity
Well Sustained*

to show moderate gain
in previous years. Sixty-five

One of more than 500 taxicabs now
operated by Public Service Co.
ordinated Transport in conjunction
with its street cars and buses



*Taxicab Operation
by Electric Railways Growing*

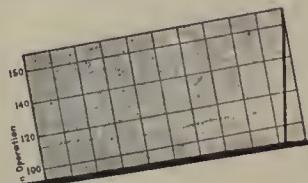
By **JOHN A. MILLER, Jr.**
Editor Electric Railway Journal

on of all street transportation
progressing through joint
street car, bus and taxicab
number of taxis operated under
y auspices nea

ciple that the taxicab is, in reality, a
conveni

Trolley Bus Experiences Unprecedented Growth During Past Year

Five new installations add 105 vehicles and 34.90 route miles. With additions of 11 trolley buses and 7.36 route miles by systems already in operation totals for industry rise to 182 vehicles and 70.05 miles.



By

Expenditures for New Equipment and Maintenance Reach High Figure



Total for 1930 less than 6 per cent under that for 1929. Increases shown for way and structure and trolley bus capital accounts, as well as maintenance materials for trolley buses, buses and power equipment. Budgets for 1931 indicate rise of almost 4 per cent over past year.

ALTHOUGH the past year was one of strenuous conditions and ended the year record. Probably the most significant fact is that expenditures for new equipment and maintenance were reduced only 5.12 per cent under the 1929 level. This was due to the effect of declining revenue it was to be

EXCERPTS FROM LAST YEAR'S ANNUAL STATISTICAL NUMBER

Among the subjects covered in the Statistical Number will be:

- Cars, buses, trolley buses and taxicabs purchased in 1931. Number of vehicles in operation. Vehicle and route mileage.
- Miles of new track constructed and reconstructed.
- Expenditures for new equipment and maintenance during 1931.
- Forecast of expenditures for new equipment and maintenance budgeted for 1932.
- 1931 revenues, costs and fares, and comparisons with previous years.

1930 Sees Rapid Strides in Railroad Electrification

Cleveland terminal and Lackawanna suburban system are notable additions to electrified trackage. Construction work progressing on Pennsylvania, New York Central and Reading installations

ress was made in the field of rail-

Changes in Electrified Steam Railroad Track in 1930
Miles of Track Extended, Abandoned, and Rebuilt

Electric Railways

Make Good Showing in a Year of Uncertainty

unfavorable business trends the
es carried nearly as many passengers
their peak years. Sharp cur-
operating expenses aided in
a reasonable net revenue

Rapid Transit Makes Advance

Comparatively little new track is added during the year, but the
way is paved for important increases in New York,
Chicago, Newark and Cleveland

INTEREST in rapid transit was unabated during the year, particularly in the larger metropolitan centers. Naturally, the greatest importance attaches to the Chicago situation, because it means the expansion of rapid transit facilities on a large scale. Ever since the Chicago elevated lines were started at the time of the World's Columbian Exposition in 1893, there has been a constant increase in the use of the city's facilities for rapid transit. The future of the rapid transit business

tainty about the operation of these lines when completed. Plans have been made for independent operation by the city, in case negotiations for unification—with one or both of the present operating companies, the Interborough Rapid Transit Company and the New York Rapid Transit Company, the latter a part of the Brooklyn-Manhattan Transit System, should be unsuccessful. At the present time a virtual agreement of policy has been reached between the two private companies, which has been followed by a more favorable attitude by the city toward the proposed plan.

- Rapid transit developments and steam road electrification.
- Taxicab operation.
- Trolley bus developments.
- Study of industry trends and forecast for the coming year.
- Advertising pages, containing reliable and practical information regarding developments in rolling stock, shop equipment, tools, operating materials, and the sources from which this equipment can be purchased.

ELECTRIC RAILWAY JOURNAL

330 WEST FORTY-SECOND STREET, NEW YORK

A BIG, FAST, POWERFUL HEAVY-DUTY CARRIER . . .

*at an Extremely
Low Price*

Climaxing years of truck building experience Reo offers the new 4-Tonner, a commercial carrier built in tractor, dump, trailer and van types for every heavy hauling need.



Engine, frame, axles, brakes, springs and all component parts are coordinated in a perfectly balanced chassis, which boasts maximum power for weight, extreme sturdiness, and utmost safety under all load and travel conditions.

REO MOTOR CAR COMPANY
LANSING · TORONTO

REO

150-inch wheelbase chassis	\$2800
170-inch wheelbase chassis	\$2875
190-inch wheelbase chassis	\$2950

Reo Trucks and Speed Wagons range from 1½ ton to 4 tons. Prices \$625 to \$2800, chassis f. o. b. Lansing

BIG 4 TONNER \$2800

REDUCES COST
32¢ PER 1000 CAR MILES
WITH NEW LUBRICANT



*High speed
train running
sixty miles
an hour.*

FLYING over the rails . . . at sixty and sometimes seventy miles an hour . . . the trains of one large high speed electric railway system* had long been subject to excessive bearing failures.

For the past ten months this company has operated all cars with L. C. Motor Journal Oil. A recent check up for this period of operation showed practically complete elimination of hot boxes. It discloses a saving of waste consumption for the first five months of \$1,001.00 and \$497.00 saved in journal brasses consumption. A total saving of nearly 32 cents per thousand car miles has been accomplished.

On other high speed lines and in ordinary

street car service Standard Oil Company (Indiana) lubricants and service have proved equally successful. In practically every instance marked savings have been made in power and waste consumption with an attending increase in the life of bearings and a reduction in bearing temperatures.

You will find it profitable to investigate L. C. Motor Journal Oil. Our engineers will be glad to furnish information and data. Address your request to the Electric Railway Division.

*Name on request.

STANDARD OIL COMPANY
(Indiana)

910 So. Michigan Avenue

Chicago, Illinois

**L. C. MOTOR
JOURNAL OIL**

Better Pole Lines are Being Built with **MONOTUBE POLES**

ELECTRIC railway officials were among the first to use Union Metal Poles when they were introduced some years ago. Today Fluted Steel and Monotube Poles are being used in many of our largest cities. They are supporting span wires and feeder lines and, in joint service with other utilities, they are carrying distribution lines, street lighting units and traffic signals. Wherever they are used they are doing a better job.

Union Metal Poles are made in one piece from high grade steel, with an electric welded vertical seam and then cold rolled. The poles possess unusual strength; they have no horizontal joints; they are attractive; they will take an abnormal load without a permanent set — factors which provide simple, economical installation and maintenance and long efficient service.

And so we say, better pole lines are being built with Union Metal Poles. If you would like to see for yourself, we would be glad to refer you to an installation of Fluted Steel or Monotube Poles in your locality.



THE UNION METAL MANUFACTURING COMPANY

GENERAL OFFICES AND FACTORY . . . CANTON, OHIO



SALES OFFICES . New York . Chicago . Boston
Los Angeles . San Francisco . Dallas . Atlanta



DISTRIBUTORS

General Electric Merchandise Distributors Graybar Electric Company, Inc.
Offices in all principal cities



• Monotube Poles Installed in
Denver, Colorado

UNION METAL MONOTUBE POLES

"Cancel the Inspection

• • •

Buy 100% R B & W Stock"

Why a great railroad system discontinued professional factory inspections of its R B & W purchases



A process in the manufacture of R B & W Bolts and Nuts. BOURKE-WHITE PHOTO

A GREAT American railroad system is now buying its entire requirements of slotted nuts from R B & W. When this railroad decided to make R B & W its exclusive supplier, it also decided to discontinue inspections at our factory prior to shipment.

Its experience in always receiving an acceptable product from us, and its confidence that we would continue to produce the railroad's requirements satisfactorily, led to the cancellation of

its professional factory inspection service and the consequent saving in the cost of the product.

Slotted nuts are the most important type of nuts used by the railroads. They must be made very accurately in size and must possess uniform strength. The quality of R B & W slotted nuts is

such that they are known as the standard by railroads everywhere.

To be sure of the best in all types of bolting material, specify R B & W products. If you have a problem involving the use of bolting material, consult the R B & W Engineering Service.



RUSSELL, BURDSALL & WARD BOLT & NUT CO.

ROCK FALLS, ILL.

PORT CHESTER, N. Y.

CORAOPOLIS, PA.

Sales Offices at Philadelphia, Detroit, Chicago, San Francisco, Los Angeles, Seattle, Portland, Ore.



ANOTHER WINNER!

GEORGIA POWER CO.
(Atlanta Division)

Based on data from various companies showing the general character, quality and cost of maintenance work done during the year, Atlanta has achieved the distinction of winning the Electric Railway Journal's Annual Maintenance Award. This is another outstanding electric railway property which installs

THERMIT JOINTS



*View on Whitehall Street,
Atlanta showing standard track
construction with Thermit
welded rail joints.*

The
METAL & THERMIT

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. San Francisco

Toronto

IT IS the stated policy of this prize-winning electric railway company to build track construction which will be economical in first cost and yet which will require very little maintenance for a long term of years. To achieve this result they recognize that joints must be as nearly as possible one hundred per cent perfect. Carrying out this idea, they have made

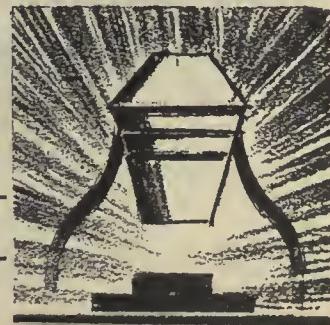
Thermit welded joints their standard construction practice in Atlanta . . . More and more companies are finding that Thermit welding practically ends the rail-joint maintenance problem. This means the elimination of broken-up paving every sixty feet. It means faster operation of cars, with smoother riding and less noise. And it means substantial savings in maintenance costs as proved in Atlanta.



Pouring a Thermit weld, with 80 lb. A.S.C.E. rail in East Point line, Atlanta.



With Thermit welded joints, Atlanta's track is smooth and unbroken by bad joints.



CORPORATION

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. San Francisco

Toronto

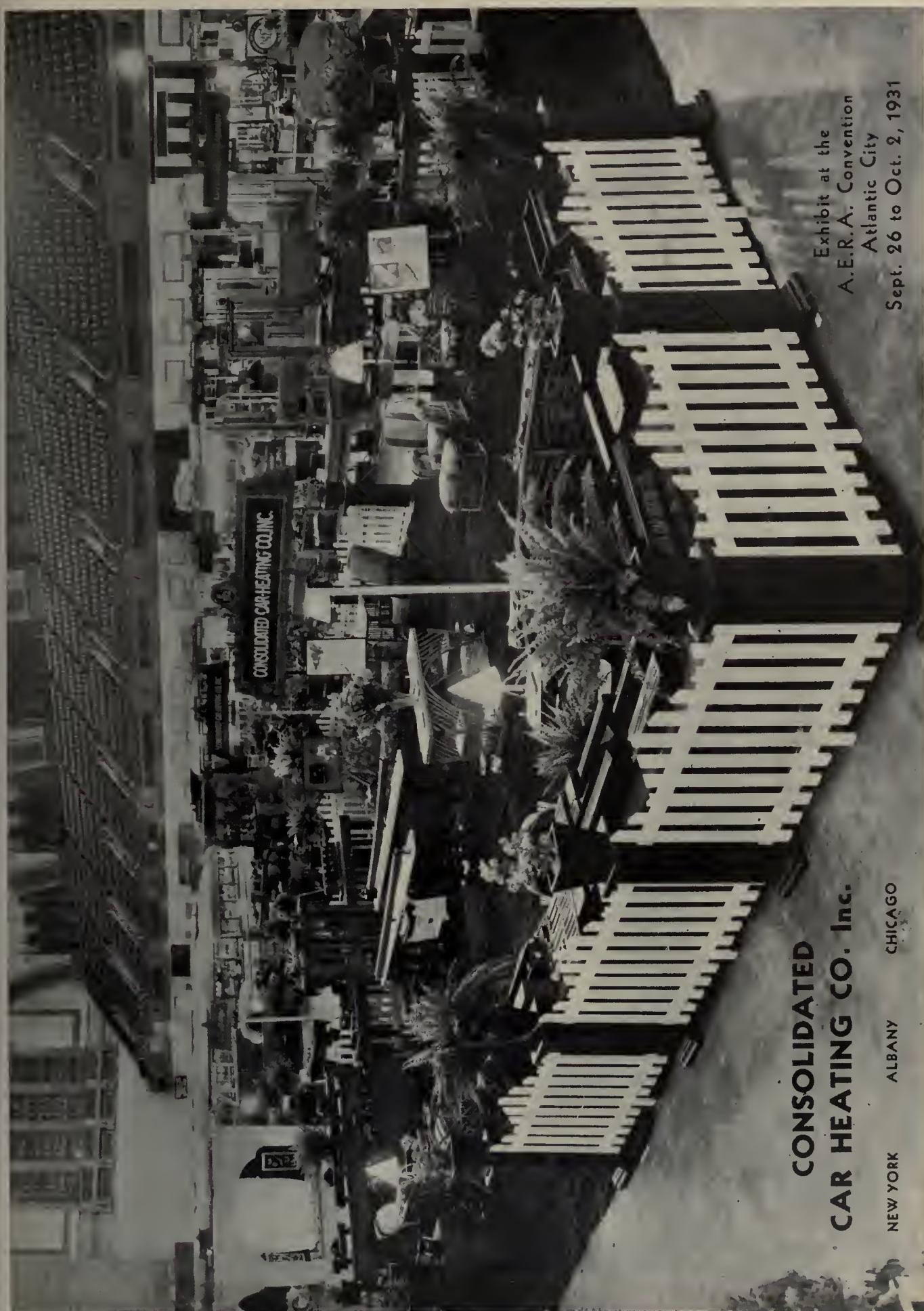


Insulating MATERIALS

The dependability of electrical apparatus is determined often by the quality of its insulating materials. General Electric, to insure this dependability, manufactures the Insulating Materials used in its many products. These same Insulating Materials that are manufactured, used and recommended by the General Electric Company can be obtained from your nearest General Electric Merchandise Distributor. See him, or write Section M-3111, Merchandise Department, Bridgeport, Connecticut.

GENERAL ELECTRIC

INSULATING MATERIALS

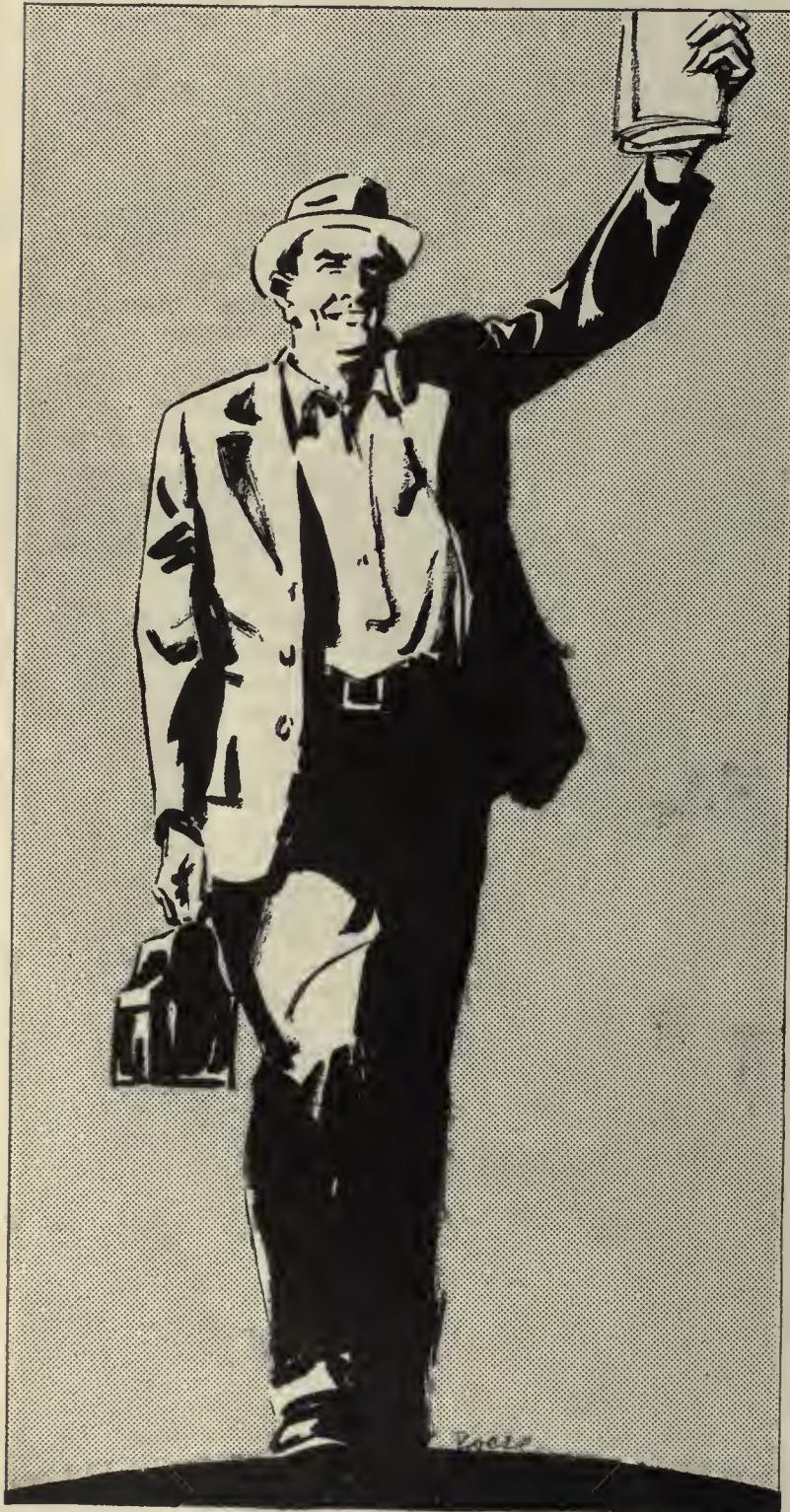


**CONSOLIDATED
CAR HEATING CO. Inc.**

NEW YORK ALBANY CHICAGO

Exhibit at the
A.E.R.A. Convention
Atlantic City
Sept. 26 to Oct. 2, 1931

Keep his head up and we'll all come through!



You recognize this man. He lives in your own town, not far from you . . .

Though faced with unemployment, he is combating adversity with courage. He has retreated step by step, but fighting. He has spread his slender resources as far as they will go.

This winter he and his family will need your help.

There are many other heads of families much like him in the United States. This winter all of them will need the help of their more fortunate neighbors.

This is an emergency. It is temporary. But it exists. It must be met with the hopefulness and resource typical of American conduct in emergencies.

Be ready! Right now in every city, town and village, funds are being gathered for local needs—through the established welfare and relief agencies, the Community Chest, or special Emergency Unemployment Committees . . .

The usual few dollars which we regularly give will this year not be enough. Those of us whose earnings have not been cut off can and must double, triple, quadruple our contributions.

By doing so we shall be doing the best possible service to ourselves. All that America needs right now is courage. We have the resources. We have the man power. We have the opportunity for world leadership.

Let's set an example to all the world. Let's lay the foundation for better days that are sure to come.

*The President's Organization on
Unemployment Relief*

Walter S. Gifford
WALTER S. GIFFORD, DIRECTOR
Committee on Mobilization of Relief Resources

Owen D. Young

OWEN D. YOUNG, CHAIRMAN

The President's Organization on Unemployment Relief is non-political and non-sectarian. Its purpose is to aid local welfare and relief agencies everywhere to provide for local needs. All facilities for the nation-wide program, including this advertisement, have been furnished to the Committee without cost.

You must sell rides!



How the aggressive selling of Weekly Passes, Sunday Passes, Nickel Passes, Shoppers' Passes and Special Passes increases volume, net and off-peak business



Washington is using this form of pass with great success. It is keyed and colored for instant identification.

Retail merchants have been able to hold up their business volume by inducing shoppers to *buy in quantity*. Similarly, many progressive railway and bus operators are actually increasing their revenue by selling passes for various uses—at bargain prices. Results prove that this is sound business policy.

Passes should be designed to stimulate off-peak riding, such as during shopping hours, during the evening, on weekends and holidays. Our extensive experience will be valuable to you in this line.

Correct pass design results in:

1. Cash in advance.
2. Great saving in time, particularly on one-man cars.
3. Increase in riders, revenue and good will.
4. Uniform distribution of riding hours.

Let us help you

GLOBE
TICKET COMPANY
PHILADELPHIA

FACTORIES:

Philadelphia
Boston

Los Angeles
New York

Atlanta

SALES OFFICES:

Cincinnati
Baltimore
St. Louis

Pittsburgh
Cleveland
Des Moines

The SAFETY CAR CONTROL EQUIPMENT

*—will wake up
your Drowsy Cars*

IT IS surprising how easily old cars may be given new life and energy . . . They can be converted into Safety Cars—which are safer, and FASTER, especially when equipped with the Relay Valve and the Self-Lapping Brake Valve . . . These devices assure very quick build up of brake cylinder pressure and unusually flexible control of this pressure. • • • • •

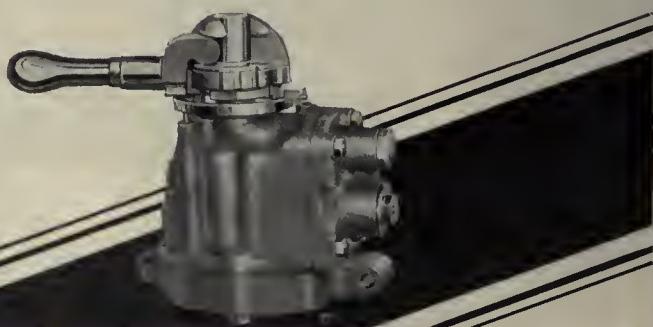
SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:

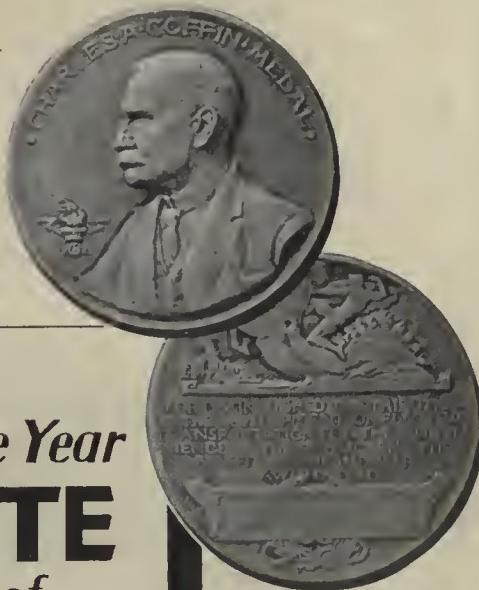
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK
WASHINGTON PITTSBURGH





Congratulations to
The Milwaukee Electric Railway
and Light Company
1931 Coffin Award Winner



-and now **9th** Consecutive Year
HASKELITE
is used by Winner of
CHARLES A. COFFIN AWARD

Haskelite opened up new possibilities to engineers in car and bus design. Consequently it has become an important factor in promoting better service, greater safety, and in establishing lower operating costs.

The more attractive bodies made possible by Haskelite can in large measure be credited for increasing the number of riders and building a more friendly public relationship.

LOWER PRICES AND
FREIGHT RATES ON
PLYMETL
NOW IN EFFECT

WHEN IT'S
TRANSPORTATION
IT'S
HASKELITE
AND
PLYMETL

3 out of 4 Winners
BUS MAINTENANCE AWARDS
are HASKELITE users

The light weight and great strength of Haskelite materially helped these winners to reduce maintenance costs. The Blue and Gray Transit Company, and the Community Traction Company, Class A winners, and the Capitol Traction Company, one of the Class B winners, are to be congratulated on the use of Haskelite and Plymetl in their equipment.

Specify Haskelite and Plymetl. Let us cooperate with you in reducing operating costs.



HASKELITE MANUFACTURING CORPORATION
120 So. LA SALLE STREET, CHICAGO, ILL.

In Canada: RAILWAY & POWER ENGINEERING CORP., LTD.

There are . . . No Uncertainties in Dixie Grading Methods!



The production of Dixie Poles is an operation of major proportions

Adequate facilities in space for sorting and drying—and in mechanical equipment, too—supplement the finest of Dense Long Leaf Yellow Pine cut from our own timber.

All Dixie products pass under the eye of our expert inspector—a definite factor for sustained uniformity in grading.



Selling Agents

GEORGE G. LEAVETTE
Room 416
25 Broadway
New York City

F. B. MERRITT
Room 1560
First National Bank Bldg.
Detroit, Mich.

JACKSON LUMBER CO.
Manufacturers
Lockhart, Alabama

A CROSSETT WATZEK GATES INDUSTRY



FREE-
a great book on
Repair Shop Diagrams
—if you act now!

To every man who subscribes to the Library of Electrical Maintenance and Repair NOW we will give a copy of Braymer and Roe's Repair Shop Diagrams and Connecting Tables for Induction Motors, the latest and most practical book on the subject. No charge for it—it comes to you FREE with this helpful maintenance and repair library.

Electrical Maintenance and Repair

5 volumes—1810 pages—1756 pictures and diagrams

Below we list the seven principal reasons why every ambitious electrician should have this library.

1. The five books in the library discuss actual repair jobs and show you step by step what to do when anything goes wrong.
2. They show you how to locate and remedy motor and generator troubles.
3. They show you how to reconnect motors to meet any condition of voltage, phase, frequency and speed.
4. They give you suggestions for preventing electrical machinery troubles.
5. They cover fully the rewinding of motors.
6. They present information that will help you get better service out of your electrical equipment.
7. They give you tables, data, kinks and diagrams that you will find of priceless value every day on every job.

Every maintenance and repair man needs them

The books contain hundreds of photographs, diagrams and tables, which show you how to go about it to make an effective repair job. There are wiring diagrams covering A.C. and D.C. generators, feeders, transformers, potential regulators, synchronous converters, batteries and boosters, substations, lamp mechanism connections, rheostats and controllers, lightning arresters, automatic switches, railway controllers, etc.

Free examination—no money down—only \$1.00 in ten days and \$2.00 a month until paid.

Fill in and mail the coupon attached and we will send you the entire set of five volumes for ten days' Free Examination. We take all the risk—pay all charges.

You assume no obligation—you pay nothing unless you decide to keep the books. Then \$1.00 in ten days and the balance at the rate of \$2.00 a month. Send the coupon NOW and see the books for yourself.

MC GRAW-HILL FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York.
Gentlemen:—Send me the New Library of Electrical Maintenance and Repair, all charges prepaid for 10 days' Free Examination. If satisfactory I will send \$1.00 in ten days and \$2.00 a month until \$15.00 has been paid. If not wanted I will return at your expense. Upon receipt of my first payment you are to send me a free copy of Braymer and Roe's Repair Shop Diagrams.

(IMPORTANT—To secure books on approval write plainly and fill in all lines.)

Name
Home Address
City and State
Name of Company
Occupation E-11-31

“TOOL STEEL” GEARS ON GEORGIA POWER COMPANY

helped Atlanta make their fine record and secure the Electric Railway Journal Maintenance Award—1931

● From 1925 to 1927 Atlanta's new car purchases were 60% equipped with “Tool Steel” gears and pinions.

Likewise many orders were placed for replacement gearing.

The long life of “Tool Steel” gears means low maintenance cost and less pull-ins, etc.

AS USUAL—in the last 10 years almost any classification of the Live Wires in the Industry, the Winners of Contests, the Men on important Rolling Stock Committees are predominantly “Tool Steel” gear users. In any discussion of gear quality “Tool Steel” is always considered the standard.

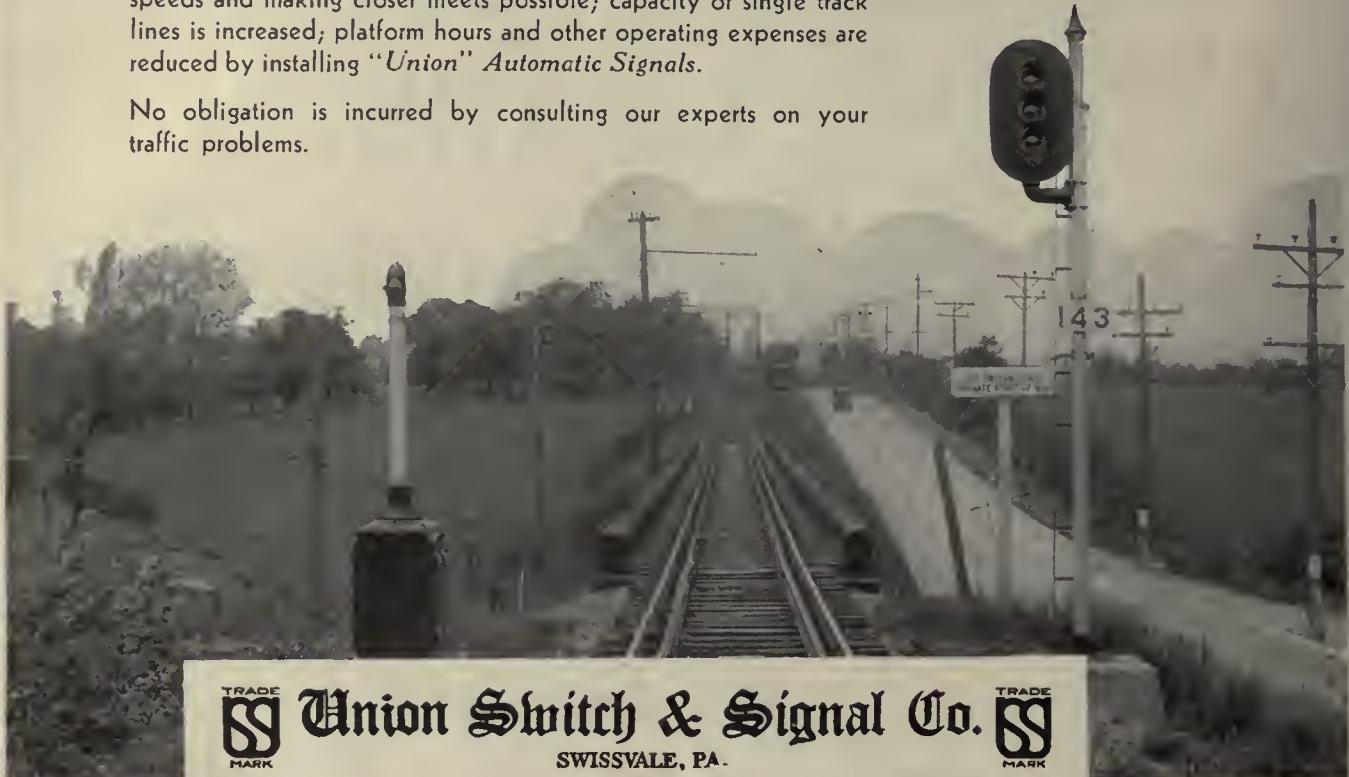
The Tool Steel Gear & Pinion Co.
CINCINNATI, OHIO



THE PEAK LOAD PROBLEM—

— is simplified; track capacity is increased by permitting higher car speeds and making closer meets possible; capacity of single track lines is increased; platform hours and other operating expenses are reduced by installing "Union" Automatic Signals.

No obligation is incurred by consulting our experts on your traffic problems.



Union Switch & Signal Co.

SWISSVALE, PA.



TUCOLITH
FLEXOLITH

Long Wearing

Even the rough brogans of stamping workmen do not injure the hard, tough surface of Tucolith floors.

6 REASONS WHY

Tucolith is the popular flooring material for cars and busses.

1. Long Life	4. Fireproof
2. Attractive	5. Sound Deadence
3. Non-Slip Surface	6. Sanitary

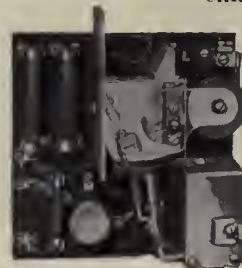
TUCO PRODUCTS CORP.
30 CHURCH ST., NEW YORK
PEOPLES GAS BLDG.
122 S. MICHIGAN AVE., CHICAGO

Utility Car Heaters fitted with

ENCLOSED HEATING elements carry the Underwriters' Laboratories Label. They give 100% energy output for what you put in.



CHROMALOX STRIP



UTILITY HEAT REGULATORS economize in current consumption.

UTILITY HONEY-COMB VENTILATORS keep the air pure and wholesome.

RAILWAY UTILITY COMPANY

2241-47 Indiana Ave., Chicago
J. H. DENTON, Eastern Mgr.
1328 Broadway, New York

Car Comfort
with
*Utility Heaters
Regulators
Ventilators*

THE OLD AND THE NEW

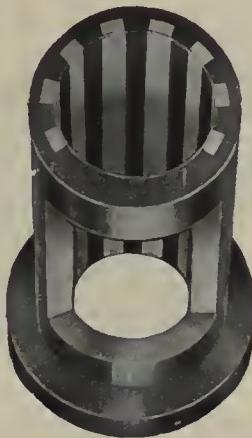
Time marches on—everything changes, and it is necessary to realize that traditional processes of the past become obsolete in the future.

Speed has cut down distances, but, as a consequence, many unforeseen operating problems have accompanied this marvelous development.

In the manufacture of Electric Motor Bronze Axle and Armature Bearings, Trolley Wheels and Harps, and Babbitt Metals, we have always made it a point to incorporate the last word in design and mechanical efficiency.

The "VIGNE" Bimetallic Armature Bearing, one of our latest developments, is the result of many years of study in search of an Armature Bearing that would give longer life for less money. You should be interested to know more about this Armature Bearing.

Descriptive booklet will be sent you upon request.



THE "VIGNE" BIMETALLIC ARMATURE BEARING

NATIONAL BEARING METALS CORP.
St. Louis, Mo.

New York, N. Y. Jersey City, N. J. Pittsburgh, Pa.
Meadville, Pa. Portsmouth, Va. St. Paul, Minn.

Illinois Resurfaces $63\frac{2}{3}$ MILES WITH BRICK



(Above) Completed brick resurfacing of worn concrete by Illinois State Highway Department on Route 4 south of Springfield. This gives the highest type highway at low cost.

(Inset) Worn slab being prepared for curb and brick resurfacing.

Photos by courtesy of Division of Highways,
State of Illinois

ILLINOIS began a brilliant chapter in highway economy this year, by widening and resurfacing worn concrete roads with brick.

A total of 63.23 miles constituted the initial program.

Thus, slabs that have not too far approached the end of their usefulness are being saved for many years to come. Brick pavements built 30 and 40 years ago are in constant use today, although not nearly so well constructed as these Illinois brick resurfaced sections.

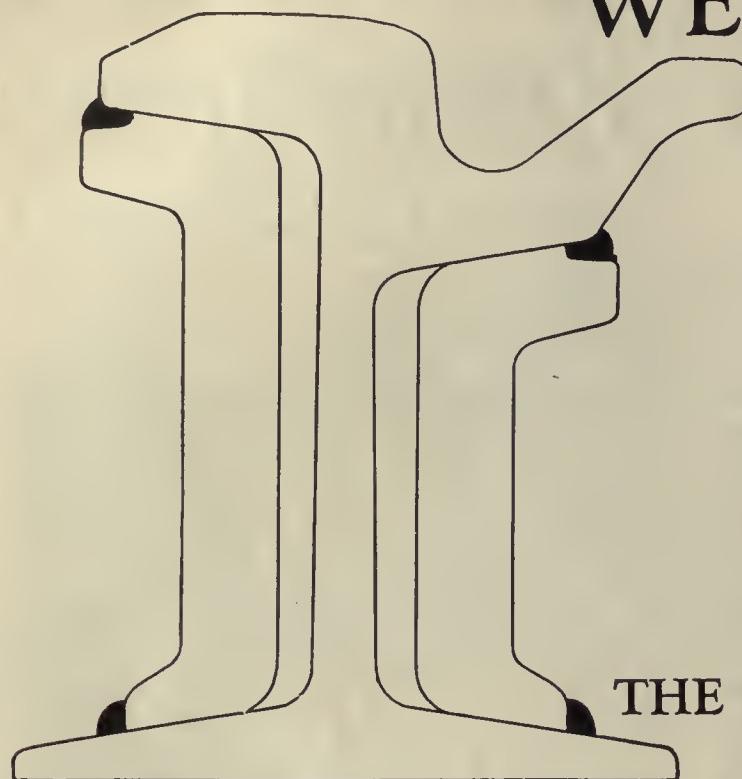
The economy and sound judgment in resurfacing with brick is apparent. The worn concrete—unsatisfactory as a pavement—will make a good base on a subgrade that has received its full settlement. Mastic cushion and bituminous filled brick surface prevent transmission of cracks. Weather and traffic will have no effect on the brick surface. The existing slab has been transformed into a low-maintenance road extraordinarily well suited to all traffic.

Highway engineers, officials and taxpayers will find much of interest in this Illinois work.

Further information on resurfacing with brick may be had by addressing the National Paving Brick Association, 1245 National Press Building, Washington, D. C.

"WELD PLATES"

For EFFICIENT, ECONOMICAL
JOINTS



Do you believe in statistics? Rely on performance records? If so, the performance records of the many "Weld Plates" now in use will convince you that they lead the bar-weld joints in efficiency and economy.

"Weld Plates" represent the most modern welding practice. They are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

A trial will convince you of their efficiency and economy.

THE RAIL JOINT COMPANY
165 Broadway, New York

STOP

Car

Turns Right

That's the message flashed motorists by the Nachod Turn Right Signal ... preventing serious side-swiping accidents ... saving life and property. No law suits filed ... no damages for the Railway Company to pay. Play safe. Install these ever vigilant automatic watchmen wherever street cars turn unexpectedly. Quotations Gladly Furnished on Request. Nachod & United States Signal Co., Inc., Louisville, Ky., Manufacturers of Block and Highway Crossing Signals.

NACHOD SIGNALS

"Spell Safety"

CHOSEN for PERFORMANCE

TROLLEY wheels are never chosen for looks, never selected because one kind costs a little more or less than another. They're chosen for performance. That's why

KALAMAZOO



trolley wheels and harps are the standard of comparison today. That's why many properties use them exclusively. There's a difference in trolley wheels. May we tell you about it?

THE STAR BRASS WORKS
KALAMAZOO, MICHIGAN



Maintenance awards are earned by a combination of personnel and equipment.

The American Brake Shoe and Foundry Co., and its associated companies extend their congratulations to The Georgia Power Company (Atlanta Division), and to its Officers and personnel—for winning the 1931 Maintenance Award of the Electric Railway Journal.



The American Brake Shoe and Foundry Company

230 Park Ave., New York
332 So. Michigan Ave., Chicago

Atlanta Division Georgia Power Company *wins* MAINTENANCE CONTEST



.... and have used

PANTASOTE
and
AGASOTE
as their
STANDARD
for years

Again and again — for 34 years — Pantasote Products have proved their economy in maintenance.

The Georgia Power Company appreciated this fact when they standardized on Pantasote for curtains and Agasote for headlinings, keeping their maintenance costs on these items to zero.

Acceptance of Pantasote Products by this progressive operator, points to the maintenance economy which you, too, may achieve by standardizing on **PANTASOTE** and **AGASOTE** for your cars and buses.

THE PANTASOTE COMPANY, Inc.
250 Park Avenue, New York

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131 State St., BOSTON

A Personal Want—

can invariably
be filled by
a friend.

The Searchlight Section

of this issue covers the current
business wants of the industries
in which this paper is read.

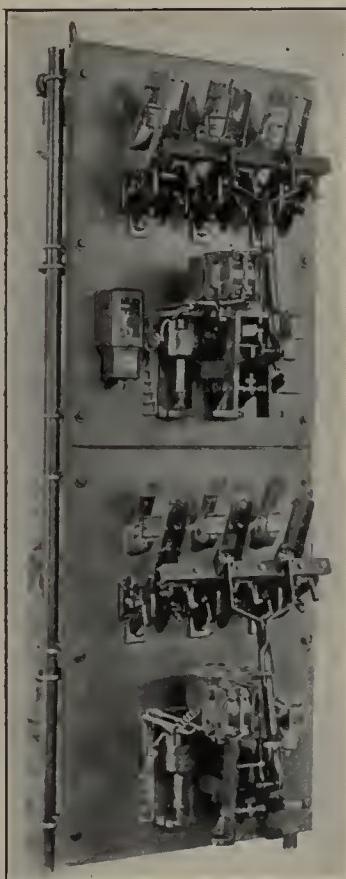
For Every Business Want
“Think SEARCHLIGHT First”

A Business Want—

must be satisfied
by someone in
your industry.

0134

Introducing ROLLER-SMITH



Automatic Circuit Transfer Equipment
ROLLER-SMITH offers a complete line of
Air and Oil Circuit Breakers

for automatically transferring the load from the regular to the stand-by circuit in case of failure of the regular circuit—then back to the regular circuit, if desired.

The equipment is available in all ampere capacities, for all voltages and in all styles of trips and combinations.

both Air and Oil

Send us your specifications or, better still, get in touch with the R-S office nearest you. There is one in every principal City in the United States and Canada.

Roller-Smith Products: Instruments, indicating and graphic; Circuit Breakers, air and oil; Relays and Control Panels of all kinds for all purposes.

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ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

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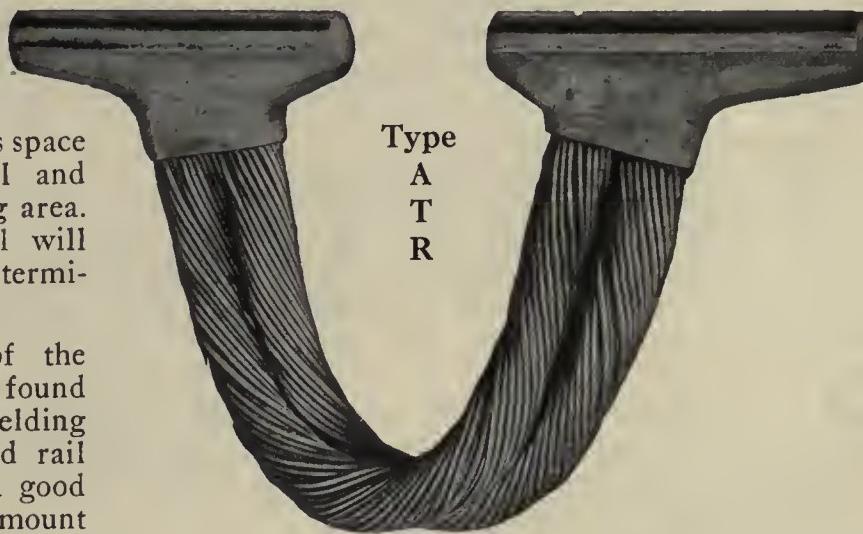


WORKS
 Bethlehem, Penna.

INVESTIGATE the I type ATR Steel Arc Weld bond. The round steel terminal occupies less space on the ball of the rail and still leaves ample welding area. Thus a badly worn rail will easily accommodate the terminals of this bond.

A further advantage of the round terminal design is found in application. The welding vee between terminal and rail makes it easy to secure a good sound weld with a small amount of weld metal. The short current path thru the weld metal to the rail introduces a minimum of weld metal resistance.

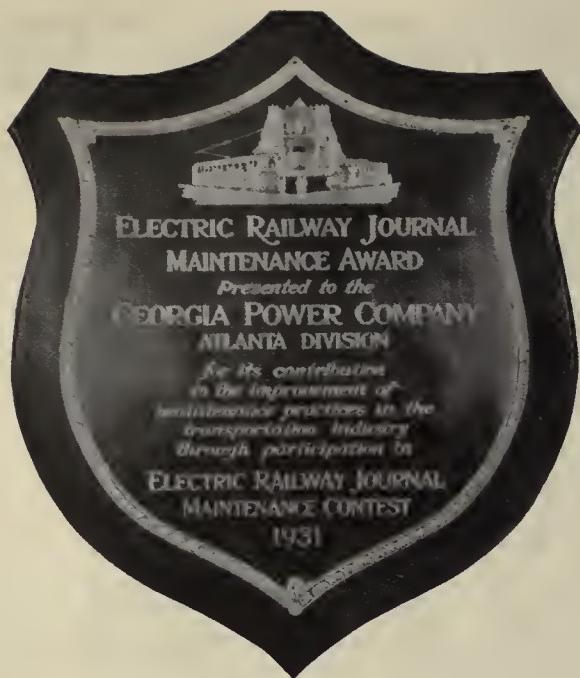
It costs less to bond than not to bond. Let us quote on your bonding requirements now. Address—



If Your Rail is
Badly Worn

The Electric Railway Improvement Co.

2070 E. 61st Place, Cleveland, Ohio



Winners of Maintenance Awards Use OAKITE

THE winner of this year's Electric Railway Journal Award . . . four out of five of the Bus Transportation Award Winners in 1930 . . . a majority of the winners of Bus Transportation Awards this year . . . use Oakite for maintenance cleaning.

All leaders in their respective fields, these winners . . . whose efficiency in maintenance work is generally recognized . . . have found that whether it is washing street cars or buses, cleaning motors, chassis, or repair parts, washing oil-soaked floors, Oakite materials offer the most dependable means of doing the work economically.

Have our nearby Service Man go over your cleaning operations with you. His suggestions should help you save money, time and effort wherever cleaning is concerned. You incur no obligation in availing yourself of his help. Write us today and we will have him call.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 28B Thames Street, NEW YORK, N. Y.

OAKITE

TRADE MARK REG. U. S. PAT. OFF.
Industrial Cleaning Materials and Methods

ALPHABETICAL INDEX

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

	Page
Aluminum Co., of America	27
American Brake Shoe & Foundry Co.	47
American Car Co.	Third Cover
American Steel & Wire Co.	10
American Steel Foundries.	15
Beeler Organization	48
Bibbins, J. Roland	48
Brill Co., The J. G.	Third Cover
Buchanan & Laying Corp.	48
Byllesby Eng. Manag. Corp.	48
Carnegie Steel Company	22
Collier, Inc., Barron G.	23
Consolidated Car Heating Co.	37
De Vilbiss Company, The.....	16
Electric Railway Improvement Co.	49
Electric Service Supplies Co.	7
Electric Storage Battery Co.	25
Fargo Motor Corp.	Front Cover
General Electric Co.	8-36
General Motors Truck Co.	Insert 17-20
Globe Ticket Co.	39
Goodyear Tire & Rubber Co.	11
Haskelite Mfg. Co.	41
Hemphill & Wells	48
Jackson Lumber Co.	42
Jackson, Walter	48
Johns-Manville	26
Kelker, Jr., R. F.	48
Kuhlman Car Co.	Third Cover
McGraw-Hill Book Co., Inc.	42
Metal & Thermit Corp.	34-35
Nachod and U. S. Signal Co.	46
National Bearing Metals Corp.	45
National Brake Co., Inc.	9
National Paving Brick Ass'n	45
National Pneumatic Co.	5
Ohio Brass Co.	6
Oakite Products, Inc.	50
Pantasote Co., Inc., The	47
Rail Joint Company, The	46
Railway Track-work Co.	14
Railway Utility Co.	44
Reo Motor Car Co.	30
Ricbey, Albert	48
Roller-Smith Company	49
Russell, Burdsall & Ward Bolt & Nut Co.	33
Safety Car Devices Co.	40
Searchlight Section	51
SKF Industries, Inc.	24
Standard Oil Co., (Indiana)	21-31
Standard Oil Co. of New York	52
Standard Steel Works Co.	13
Star Brass Works, The	46
Texas Co., The	12
Timken Detroit Axle Co.	Back Cover
Tool Steel Gear & Pinion Co.	43
Tuco Products Corp.	44
Union Metal Mfg. Co., The	32
Union Switch & Signal Co.	44
Wason Mfg. Corp.	Third Cover
Westinghouse Elec. & Mfg. Co.	Second Cover
Westinghouse Traction Brake Co.	4
Wish Service, The P. Edw.	48
Yellow Coach	Insert 17-20

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R.J.

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Let us handle this for you. We specialize in buying and dismantling entire railroads, street railways, industrial and public service properties which have ceased operation. We furnish expert appraisals on all such properties.

Consult us also about New and Relaying Rails—all weights and sections. You will like our service.

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(Capital \$1,000,000.00)

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Pacific Sales Office—Failing Building, Portland, Oregon

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT,
CIRCULATION, ETC., REQUIRED BY THE
ACT OF CONGRESS OF AUGUST
24, 1912

Of Electric Railway Journal, published monthly at New York, N. Y., for October 1, 1931.

County of New York { ss.
State of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication, on the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 10th Ave. & 36th St., N. Y. C. Editor, John A. Miller; 10th Ave. & 36th St., N. Y. C. Managing Editor, None. Business Manager, Louis F. Stoll, 10th Ave. & 36th St., N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 10th Ave. & 36th St., N. Y. C. Stockholders of which are: James H. McGraw, 10th Ave. & 36th St., N. Y. C. James H. McGraw, Jr., 10th Ave. & 36th St., N. Y. C. James H. McGraw, James H. McGraw, Jr. and Malcolm Muir, 10th Ave. & 36th St., N. Y. C. Trustees for: Harold W. McGraw, James H. McGraw, Jr. Donald C. McGraw, Curtis W. McGraw, Curtis W. McGraw, 370 Seventh Ave., N. Y. C. Donald C. McGraw, 10th Ave. & 36th St., N. Y. C. Harold W. McGraw, 285 Madison Avenue, N. Y. C. Anne Hugus Britton, 10th Ave. & 36th St., N. Y. C. Mason Britton, 10th Ave. & 36th St., N. Y. C. Edgar Kobak, 10th Ave. & 36th St., N. Y. C. Grace W. Mehren, 2440 Lakeview Ave., Chicago, Ill. J. Malcolm Muir & Guaranty Trust Co. of New York. Trustees for Lida Kelly Muir, 524 Fifth Ave., N. Y. C. F. S. Weatherby, 271 Clinton Road, Brookline, Mass. Midwood Corporation, Madison, N. J. Stockholders of which are: Edwin S. Wilsey, Madison, N. J. Eise M. Wilsey, Madison, N. J.

3. That the known bondholders, mortgagees and other security holders owing or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

C. H. THOMPSON, Secretary.

MCGRAW-HILL PUBLISHING COMPANY, INC.
Sworn to and subscribed before me this 23th day of September, 1931.

H. B. BEIRNE,

[SEAL]
Notary Public N. Y. Co. Clk's No. 203, Reg. No. 3B102. Kings Co. Clk's No. 636, Reg. No. 3129.

(My Commission expires March 30, 1933)

EQUIPMENT of the latest type is frequently advertised for resale in the *Searchlight Section*. Don't let a limited budget stop you from buying modern cars, or equipment that will cut costs or improve your service. Modernize your lines throughout now by buying wisely from these equipment bargains.

Stretch your Budget
To Speed Production

"Winter-Proof" your bus fleet . . .

with the new SOCONY 7-POINT SERVICE



What the NEW Socony 7-Point Service is and how it win- ter-proofs your bus fleet

- 1. Socony Auto Radiator Cleaner**—To get full protection from anti-freeze, first you need a proved radiator cleaner, such as Socony, to remove rust and scale from cooling system. It's WINTER-PROOF.
- 2. Socony Uppelub Oil**—Four ounces of prevention against WEAR, NOISE, CARBON and STICKY VALVES. Added to gasoline, it aids quick starting—lubricates parts difficult to reach by motor oil. It's WINTER-PROOF.
- 3. Socony Winter Gear Lubricants**—For easy gear shifting in cold weather you must have a lighter-grade gear lubricant. Socony has a complete new line of lubricants for winter use. They're WINTER-PROOF.
- 4. Socony Quick-starting Gasolines**—For quickest starting, choose either of Socony's two great gasolines: Special plus Ethyl, best premium gasoline; or Banner, best popular-priced gasoline. Both are WINTER-PROOF.
- 5. Socony De-waxed Motor Oil**—A completely de-waxed motor oil! Lubricates instantly—in sub-zero weather! It's WINTER-PROOF.
- 6. Socony Lubrication**—To withstand the brunt of winter, your buses must be lubricated *correctly* at every point. The Socony man doesn't miss—doesn't guess! He covers every point with the right lubricant.
- 7. Anti-Freeze Protection**—And don't forget the winter preparation of your bus fleet is not complete without anti-freeze. Your Socony man supplies this "winter-proof" protection. Get it today!

Winter will get you IF YOU DON'T LOOK OUT! So groom up your buses TODAY...and feel sure—BE sure—of "summer performance" all the cold winter long! Socony offers a brand-new, thorough winter-maintenance service that makes your buses *fit* for the toughest, roughest cold-weather driving conditions. It's called "SOCONY 7-POINT SERVICE." It *winter-proofs* a bus from stem to stern. • Study the seven points outlined in the left-hand column. These are the things a bus needs if you want to get better performance this winter. A Socony man can give the complete 7-Point Service in just a few minutes' time. • Stop in—TODAY—at any convenient Socony dealer, garage or service station. Get this new and thorough SOCONY 7-POINT SERVICE. Winter-proof your bus fleet NOW...and save money!

ELECTRIC RAILWAY JOURNAL

MORRIS BUCK
Engineering Editor
GEORGE J. MACMURRAY
CLIFFORD A. FAUST
CHARLES J. ROOKE

LOUIS F. STOLL
Publishing Director

Vol. 75, No. 13

Consolidation of
Street Railway Journal and Electric Railway Review
Established 1884—McGraw-Hill Publishing Company, Inc.

JOHN A. MILLER, Editor

Page 671-724

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Chicago
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ALEX McCALLUM
London, England

The Real Facts of the Situation!

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January Is the Date

McGraw-Hill Publishing Company, Inc.

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"MACHINIST, N. Y."

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SAN FRANCISCO - 883 Mission Street
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WASHINGTON - National Press Building
PHILADELPHIA - 1600 Arch Street
CLEVELAND - 501 Guardian Building
DETROIT - 2-257 General Motors Building
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BOSTON - 1427 Statler Building
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1931

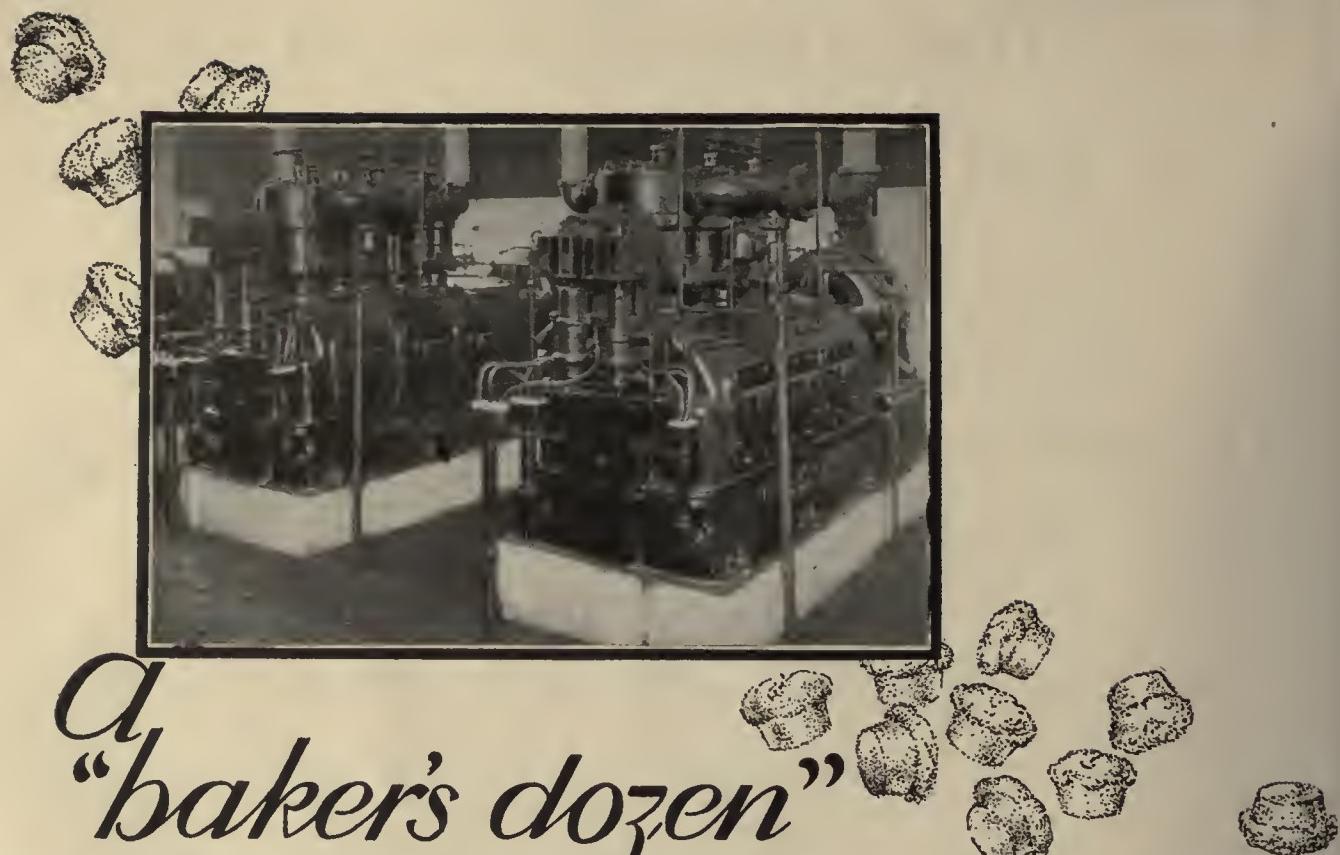
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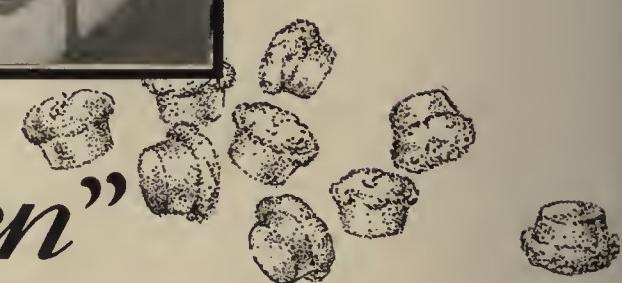
Contents of This Issue

DECEMBER, 1931

Copyright, 1931, by McGraw-Hill Publishing Company, Inc.

Editorials	671
Building Public Good Will..... By JOHN J. CORNWELL	674
High-Speed Service Ushers in a New Era on Philadelphia & Western	676
German Railway Installs Trolley Buses.....	681
Municipal Tramway Taxation..... By J. BECKETT and JOHN SPARGO	682
Transportation Not Neglected in City Planning Study at Harvard..... By H. V. HUBBARD	684
Rebuilding Track Under Heavy Traffic..... By E. P. LEGARE	685
Form Designed for Standardized Analysis of Claims Statistics.....	689
El Paso Rebuilds Cars for Greater Safety and Speed..... By J. E. LAWLESS	692
Progress in Railway Transformer Design..... By S. S. COOK and C. BROCKMAN	693
London Underground Railway Modernizes Signal Equipment.....	695
Analysis of Maintenance Costs on 43 Properties.....	697
Practical Ideas for the Maintenance Man:	
Tail Light Warns of Defective Line Switch—By R. W. James	700
Bumper Straightener—By W. R. McRae	700
High-Speed Motors Require Special Maintenance Practice—By J. K. Stots.....	701
Cutting Tool for Compressor Pistons—By A. J. Lee.....	702
Pin Insulator with Clamping Devices—By H. C. Englehardt	702
Stand for Axle Repairs.....	702
Special Wrenches for Electric Couplers—By Frank Ayerhart	703
Expanding Undersize Sleeve Bearings—By Michael Axler	703
Relining Brakes for Greater Bus Mileage—By C. B. Lindsey	703
Cradle for Removal of Wheels and Axles from Cars—By W. Dillon and T. G. Culham	704
Electrically Controlled Derailer—By E. B. Spenser	704
Adjustable Bench Clamp.....	704
New Products for the Railways' Use.....	705
Trends of Revenues and Expenses.....	709
News of the Industry.....	711



a
"baker's dozen" 
in AIR COMPRESSOR VALUE

JUST as the old-time baker threw in an extra bun for good measure, so the builders of Westinghouse-National Air Compressors add extra value to the machines they build . . . They save valuable space for the user by designing compact machines that are driven direct by the motor or through efficient herringbone gearing . . . they save installation cost by making complete self-contained machines that need no elaborate foundation nor require extensive auxiliary apparatus . . . they save operating expense by providing complete Automatic Control of distinctive type—which insures that the power consumed will be in proportion to the air compressed . . . they save maintenance expense by building durable machines that will operate for a score of years with minimum time and material for attention and upkeep—thus maintaining the noteworthy tradition of "Quality Machines for Quality Service" . . . Sizes range from $2\frac{1}{2}$ to 700 cu. ft. displacement—for power house, car barn, or shop . . .

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Air Compressors

N. P. Treadles

A paying investment for Third Avenue Railway of New York

Third Avenue Railway

Reports total combined net income on railway and bus operations of \$291,426 for twelve months ended June 30, compared with a net loss of \$199,460 for the preceding twelve months, while total operating revenues were \$16,876,140, a decrease of \$742,434. Earnings in the railway division decreased \$1,032,987, while those of the bus division increased \$290,553. Operating expenses were \$12,867,490, a decrease of \$1,220,827, with the railway department's costs decreasing \$1,158,468 and the bus expenses falling off \$62,358.

Reprinted from the financial page of the New York Herald-Tribune of July 29th.

Third Avenue's Good Showing

In discussing in a recent issue the prospects for Third Avenue Railway, New York, refunding 4's, 1960, the *Wall Street Journal* said that increases in net income reported by the Third Avenue Railway have been recorded in the face of a decrease in gross revenue. Conversion of two-man into one-man cars has enabled the company to strengthen its profit base. Expenses have been reduced in line with the decrease in gross so that practically all of the saving accruing through one-man operation of cars has been added to net. Cost of converting the cars for the new system of operation has been charged to current expenses; when this work is completed, there should be further savings in expenses, assuming continued control over other operating costs. Substitution of buses for trolley cars, at a 10-cent fare instead of 5 cents, increase in number of lines operated and reduction in per-mile costs have converted a loss from the bus division into a profit. The company estimated that bus costs have been reduced 4 cents a mile, and that receipts have been increased 1 cent a mile operated. Expenditures for plant and equipment have not been restricted.

Reprinted from Electric Railway Journal News of Oct. 24, 1931.

The Third Avenue Railway of New York turned a serious deficit into a substantial profit by remodeling their two-man cars for one-man operation.

These cars maintain satisfactory schedules safely, because N. P. Automatic Treadles guard the rear exit doors.

Write for details.

NATIONAL PNEUMATIC COMPANY

Trolley Bus Revenue Improves Dividend Outlook



ELECTRIC railway operators are quickly perceiving and utilizing the profit possibilities of the trolley bus. Intelligent investments are being made in this swift, comfortable method of transportation. Evidence of the wisdom of such judgment is to be found in the favorable revenue reports of existing lines.

Naturally a portion of this revenue must be set aside for normal maintenance. Yet, the ultimate worth of the trolley bus will be judged by the amount which may be conserved for dividends on the investments rather than for abnormal maintenance and replacement expense. A problem which, no doubt, accounts for the care which is being used in the initial selection of materials for new systems.

Realizing the importance of this problem, O-B overhead equipment and bus accessories have been designed and are manufactured to give just a little longer and just a little better service than is the normal expectation. Reason why, perhaps, the O-B trademark is so much in evidence on existing systems. Reason, too, why users of O-B materials conserve more and more for dividends and need to devote less and less to overhead and bus accessory maintenance.

Perhaps you may be ready to discuss proposed trolley bus installations with your O-B representative. Likewise, publication 403G is filled with valuable information on this subject and will gladly be sent upon request to:

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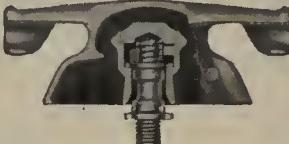
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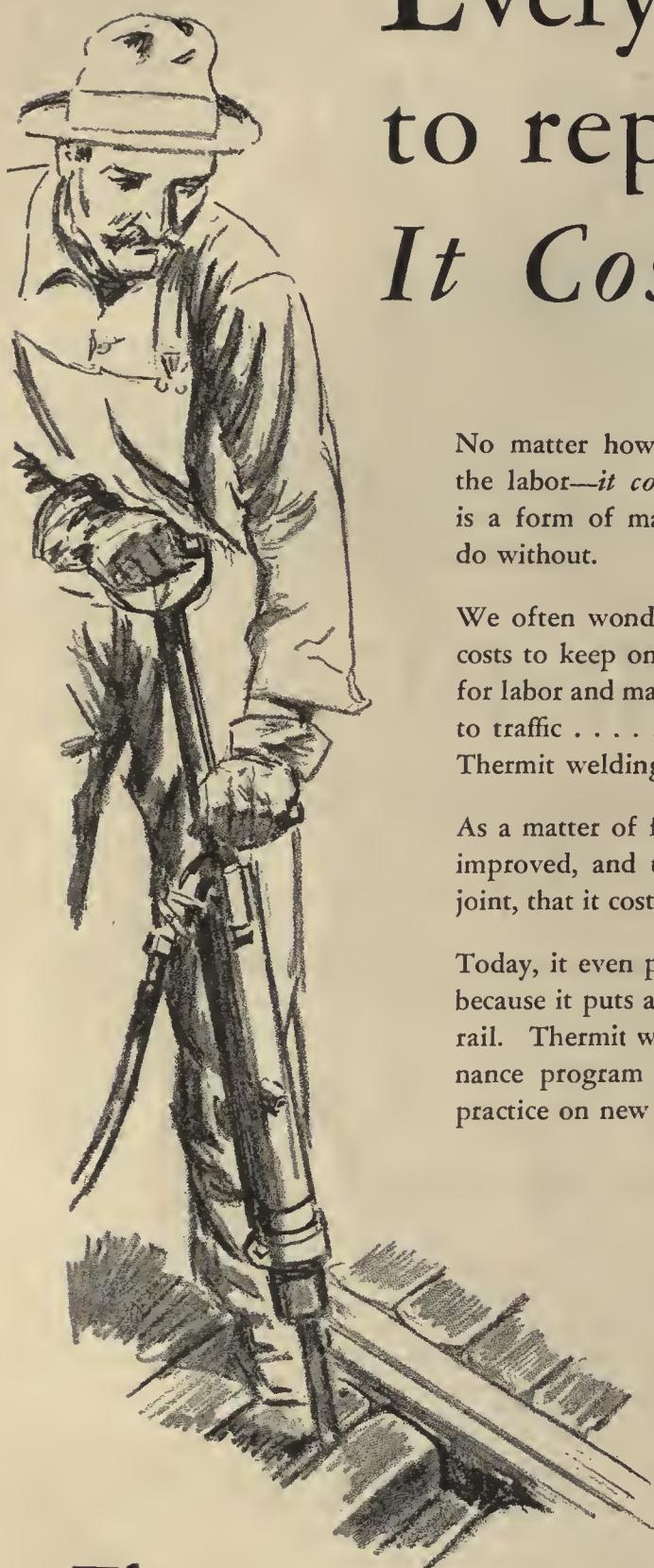
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No matter how efficient the track gang—no matter how cheap the labor—it *costs too much* to repair bad joints. Because this is a form of maintenance expense which you could just as well do without.

We often wonder if some people ever do stop to figure what it costs to keep on repairing rail joints. Just the direct costs alone, for labor and material . . . not to mention delays and inconvenience to traffic exceed any possible difference in the cost of Thermit welding in the first place.

As a matter of fact, the Thermit process is now so simplified and improved, and the quantity of Thermit required is so small per joint, that it costs little if any more than any other kind of welding.

Today, it even pays to Thermit weld the oldest joints on the line, because it puts an end to joint repairs for the remaining life of the rail. Thermit welding has become a standard part of the maintenance program of many roads, as well as the almost universal practice on new track construction.

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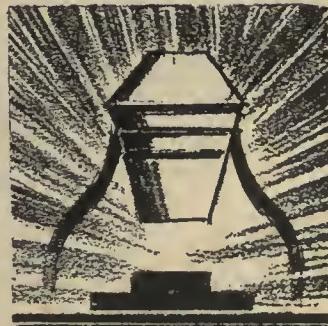
up the paving . . .



Track like this doesn't have to be opened up, the joints are
THERMIT WELDED

Here is an unretouched photograph of a piece of Thermit-welded track in San Francisco. Arrows mark the location of two Thermit-welded joints nearest the camera. Note the absolutely smooth, unbroken rail. Can you see any evidence of disintegration of the paving, anywhere along the rail? We know you can't, because there is none.

You, too, would like to have track like this. It can be done to existing old track as well as in laying new rail. Our representatives will gladly furnish further information and cost estimates.



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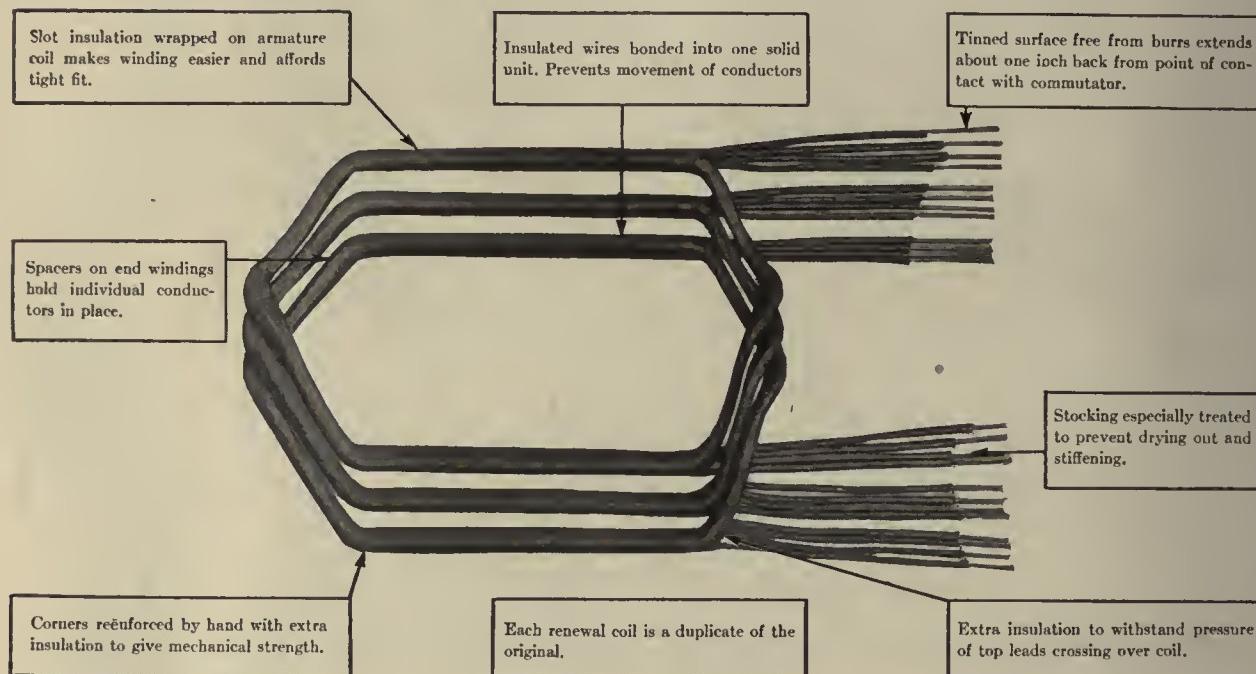
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G-E ARMATURE COILS STAND THE HEAT OF COLD-WEATHER OPERATION



Ask for publication GEA-807A, "The Repair of Armatures." It contains information of value to everyone interested in obtaining the utmost service from electric traction motors. Copies will be mailed without charge. Address the G-E office nearest you or General Electric Company, Schenectady, N.Y.

SNOW-PACKED RAILS are tough on motors. Such conditions frequently cause spinning wheels, overheated motors, and burned-out coils. In winter or summer, it is always the safe policy to use G-E armature coils in G-E motors. G-E coils withstand heat. And they are built to fit the armature slots correctly—just right to make winding easy—just right to prevent injurious abrasion in the heat of cold-weather operation. The quality of G-E renewal coils is the same as that of the original equipment. It is a requisite of economical maintenance.

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ELECTRIC RAILWAY JOURNAL

New York.
December, 1931

Consolidation of
Street Railway Journal and Electric Railway Review
Established 1884—McGraw-Hill Publishing Company, Inc.

JOHN A. MILLER, *Editor*

Volume 75
Number 13

A Broader Name for a Broader Field

CHANGES of tremendous significance have taken place in the field of community transportation during recent years. Not so long ago the electric railway was practically the only public means of urban and interurban transportation. Today the situation is very different. The electric railway is still a vital element in community transportation, but it is not the only element. It has been supplemented by the motor bus, the trolley bus and the taxicab. A great many electric railways have adopted one or more of these newer services to supplement that of their rail lines.

Thus the term "electric railway industry" no longer indicates the actual scope of the business of furnishing community transportation. Similarly, the name ELECTRIC RAILWAY JOURNAL falls short of defining the present broad field of this publication. As both the industry and the JOURNAL have widened their scope and removed artificial limitations, so both have outgrown their old names. After careful consideration of all phases of the situation, the publishers of the JOURNAL have come to the conclusion that the paper can better serve the needs of the industry by adopting a broader name—one which will more accurately reflect the actual content of the publication. At the beginning of the new year, therefore, the name of ELECTRIC RAILWAY JOURNAL will be changed to TRANSIT JOURNAL.

The word "transit" has been associated with the activities of the industry since its earliest days. It has long been a part of the corporate name of many operating companies. At the same time it is a thoroughly modern word. During recent years numerous companies have substituted "transit" for "electric railway" in their

names to indicate the broader field of their activities. No other word so well describes the tremendously important business of furnishing public transportation in our cities and adjacent areas. Electric street railways, subways, elevated railways, motor buses, trolley buses, taxicabs, interurban electric lines and electrified suburban railroad service, all are included within the scope of the word "transit."

Adoption of the name TRANSIT JOURNAL with the issue of January, 1932, will mark the second change in title since this paper was founded in 1884 as the STREET RAILWAY JOURNAL. At that time the only public means of community transportation was the horse-drawn street car. During the next two decades the electric railway was developed and proved so successful that it replaced the horse car everywhere. In 1908 the STREET RAILWAY JOURNAL was merged with the *Electric Railway Review* under the name of ELECTRIC RAILWAY JOURNAL. In announcing that change, the paper stated that "It is thought that the new name recognizes better than the old the existing and future condition of the industry we represent."

It is for essentially the same reason that a second change is now desirable. The industry is no longer concerned only with one particular form of transportation. It is interested in all forms of community transit.

Especially is it interested in the proper co-ordination of the various forms of transportation. So also is the JOURNAL. Adoption of the name TRANSIT JOURNAL "recognizes better . . . the conditions of the industry we represent" and emphasizes the fact that all forms of community transit constitute a single industry.

*Beginning with the issue of January, 1932,
the name of*

ELECTRIC RAILWAY JOURNAL
will be changed to

TRANSIT JOURNAL

Public Transportation—City, Suburban and Interurban

Tax Relief a Real Need

TAXED to death—those are the words of the board of arbitration in the recent St. Louis wage case, referring to the payment of 1 cent out of every 10-cent fare for taxes by the St. Louis Public Service Company. "A 10 per cent levy on gross revenues is a burden seldom experienced in business, and amounts almost to an exaction," said the board. On top of that, it pointed out, is the cost of paving and its repair required in the franchise, and the expense for tearing up track and relocating it whenever street improvements make such changes necessary.

It is highly significant that a board such as this, which was composed of disinterested members, should pause to point out one of the fundamental difficulties which public transportation has to face. St. Louis is not alone in heavily taxing its transit system. Tax assessors, politically minded, are always ready to lighten the burden of the common people at the expense of the utilities. Imposts vary with the locality and the ingenuity of the authorities in devising forms of taxation. The paving burden is perhaps the most usual, but there are many others. Some properties are taxed for street lights along the right-of-way. Some maintain schools. And then there is the famous Baltimore park tax, by which the United Railways for more than 70 years has provided for maintaining the city's parks. It now costs the car riders more than \$1,000,000 a year.

In times of plenty the general belief is that the company is making so much money that taxes of this sort do not constitute a heavy burden. In years of adversity other sources of revenue have dried up, and so no relief will be considered. The only way to combat such ideas is to present the whole matter to the public forcefully and plainly, and as often as possible. It is only by such methods that an improvement in the taxation situation ever will be brought about.



Over-Manning Not a Solution of the Unemployment Problem

MANY are the suggestions being advanced in these days to relieve unemployment by hiring additional workers regardless of any actual need for their services. The peculiar thing about these proposals is that they invariably contemplate having someone else pay the wages of these additional workers.

One of the favorite suggestions of this kind is that the electric railways should be compelled to employ two men on their present one-man cars. This step is urged, not because of the need for an extra man, but simply to give jobs to some of the unemployed. No doubt this would be accomplished to a certain extent, but why be content with two men per car? If the purpose is merely to create "jobs," why not require three or even four men per car? For that matter, why not require two men on every motor truck and that the owner of every private

automobile employ a chauffeur? The latter requirements would do more to relieve unemployment than placing a second man on every electric car. Unfortunately, however, the problem is far more complex than merely finding something for the unemployed to do. The crux of the problem is to find the money to pay wages to more workers.

It is always easy to suggest ways for other people to spend their money. This is particularly true in respect to the electric railways since their operations are subject to close regulation. Moreover, the old-fashioned idea still prevails to some extent that transportation companies must necessarily be wealthy because they take in a lot of money. The fact that they also spend a lot of money is overlooked. Indeed the local transportation industry faces an even more difficult problem than most other industries in earning an income adequate to cover its expenses. Dividends have disappeared entirely in many instances and have been cut almost to the vanishing point in others. Where the money could be obtained to pay the wages of any extra employees is difficult to say.

The industry is not unmindful of the seriousness of the unemployment problem. Since the beginning of the present business depression, the local transportation companies have made a creditable record in keeping nearly all their employees on the payrolls. But they are not charitable institutions. They cannot reasonably be expected to employ additional men whose services are not needed. Moreover, it may well be doubted that the employment of two men to do the work of one is a sound policy at any time.



Actions Speak Louder Than Words

MUCH has been spoken and written in recent months about the kind of service and the fare structure that will attract riders to public transportation vehicles. Committees have been appointed to attack the various phases of the problem. Figures have been prepared to show what can be accomplished by modernization of plant and methods. But managements in general have been inclined to wait and defer the definite action that might be expected to bring increased receipts at lower operating expense.

In sharp contrast with this attitude is that of the management of the Philadelphia & Western Railway. Upon assuming control of the property some two years ago, a careful study was made of the plant, the service and the fare structure. First of all it was evident that the existing fares did not attract regular riders. A new set of rates, both for single trips and for commuters, was put in effect a year ago. It also was evident that traffic was being lost to the competing electrified railroads by virtue of their faster time between the territory served and the center of Philadelphia. Although the principal line of the P.&W. is only 14 miles long, with many sharp curves and heavy grades, it was decided to obtain new

cars with which the running time could be substantially reduced.

It would have been possible to buy heavy cars of the conventional type to do the work, but the power requirements would have been prohibitive. So a series of experiments was conducted to determine the best type of car. It was found that a car could be built largely of aluminum, and with a new type of truck and careful streamlining, the power demand could be held to little more than half of that of a conventional car for similar speeds. It took courage to build cars of the radical design indicated, but the decision was made without hesitation.

Other steps that were taken in the modernization were the construction of a new terminal building at Norristown, the reconstruction of cars which could be used for local service with fast schedules, and reconstruction of the track to permit cars to run at the high speeds. All told, the company has spent a half-million dollars in the rehabilitation.

If the reception which was given to the opening of the terminal and the start of the new service last month is an indication, it will mark the beginning of prosperity for the railway. While others are awaiting the results, the owners of the Philadelphia & Western will be obtaining them.

Somewhat different is the situation confronting the Capital Traction Company. Besides the shrinkage in business which nearly every transit line has had to face, unregulated cheap taxicabs have been allowed to run riot in Washington. They have caused the local lines to sustain severe losses during recent months. If allowed to continue they will threaten the existence of organized transportation in the city. But in this instance, too, the management is convinced that the public will in the long run play fair. Accordingly, it is going ahead with the purchase of new cars which will cost more than a half million dollars, and intends to adopt as modern a design as the status of the art will permit.

In both these instances the raising of new money shows a moral courage and aggressiveness that may be taken as an example by others with similar problems. In both of them actions speak louder than words.



The New Aristocrat of Labor

CHARACTER rather than financial standing was the criterion by which a famous financier was accustomed to appraise prospective borrowers, and it is said that he suffered few losses. In a somewhat similar way tenure of office rather than temporary earning power due to high wages is now being used as a basis of credit appraisal. The man with a steady job has become the new aristocrat of labor replacing the former aristocracy of the trowel, the hammer and the shovel, who received fabulous wages a few years ago. Worthy though these artisans are, their former wages reflected the effect of certain post-war conditions rather than the actual value

of their services to society. In those boom times, sight was lost of other artisans equally needed in the scheme of civilization such as the employees of the electric railway and public utility companies. From the standpoint of wages, these utility workers were less fortunate than those in other lines, but they enjoyed a highly desirable tenure of office. This is now in the process of being rediscovered. As unemployment has increased in many trades, the utility employee has taken on a new dignity among those who labor.



Legal Status of the Trolley Bus Becoming More Clearly Defined

CLASSIFICATION of the trolley bus as a street car for the purpose of legislation and taxation has already received legal sanction in several States, and indications are that others will follow suit. The reasons for this classification are obvious. In every instance to date, trolley buses have been installed by an electric railway company, and their operation is controlled by a franchise wherein compensation for street use is fixed. To impose further fees or taxes upon them would be manifestly inequitable.

Moreover, if the trolley bus were to be classified as a highway vehicle like the gasoline bus, it would be restricted in design as to length and width. Highway vehicles as a class are limited to a maximum width of 8 ft., while street cars are usually built wider, some of them as wide as 9 ft. Classification of a trolley bus as a street car permits it to be built 9 ft. wide, thus giving an additional foot of width to be used for wider aisles without sacrificing seat space. This factor is important. The wider aisles permit freer circulation of passengers. The advantages of the trolley bus in fast acceleration and braking, permitting of fast schedules, would be largely destroyed if the vehicle were unduly restricted in width, and the movement of passengers correspondingly hampered.

Since the trolley bus operates on a fixed route, there is no possibility of its finding its way onto the open highways where limitation of vehicle width may be desirable. It is on this basis that the classification of the trolley bus as a street car has been adopted in a number of States. In Illinois a new law became effective on July 1, classifying trolley buses as street cars by amending the existing law which excluded from the definition of motor vehicle all "cars of electric and steam railways and other motor vehicles running only upon fixed rails or tracks." To this exemption was added the classification "or propelled by electric power obtained from overhead trolley wires." Similarly, in Wisconsin legislation has been passed which puts the trolley bus definitely in the same category as the street car on the basis that it is a vehicle operated by means of fixed surface or overhead structures. With these examples to establish the precedent, it may be expected that other States will fall in line by adopting the same classification policy.

Building Public Good Will

By

JOHN J. CORNWELL

General Counsel

*and Chairman Central Committee on Public Relations
Baltimore & Ohio Railroad*

As Told to PAUL WOOTON

QUALITY is essential in any product. Transportation is no exception. But if a business is to be successful, other factors are necessary in addition to quality, more necessary in this era of sharp competition and discriminating judgment on the part of the public than ever before. Besides quality there must be salesmanship. An article of splendid quality may lie long unsold unless something is done to call attention to its merit. It is particularly important that courtesy and good taste be used in calling attention to the quality of the article for sale. Transportation in this respect is the same as goods on the shelf. A superior commodity or a superior service must be proffered in a polite and agreeable manner. The service alone does not sell itself.

The public service corporation, publicly regulated, is just now more carefully scrutinized and more critically observed by the public, in so far as its methods and its products are concerned, than other corporations or concerns. Especially is this true of transportation companies—steam and electric railroads—because of the new and competitive freight and passenger transportation on waterways, highways and in the air. This is now generally recognized but it was not always so.

Because of this, good public relations are essential. The Baltimore & Ohio Railroad was one of the pioneers in this field. More than a score of years ago when Daniel Willard came to the company as president, in addressing the first general staff meeting, he proclaimed what we know as his "good neighbor" policy, declaring that he wanted the company to be a "good neighbor." It is not practicable to define the things the company or its agents and employees must do to be a good neighbor. Too many unforeseen and unexpected things happen in connection with the operation of a great railroad system to undertake to fix formulas for handling all of them. It does imply fair dealing, good service and courteous treatment.

Naturally, the habits and state of mind of many thousands of people can not be altered or remade over night, and the viewpoints of railroad officers and employees twenty years ago were not what they are today. However, the seed planted in the organization then took root and grew, and we of the company like to believe that today it is imbued from top to bottom with the good-neighbor spirit.

Elbert Hubbard often quoted Ralph Waldo Emerson as having said: "Every great institution is the lengthened shadow of one man." Whether Emerson said it or not, it is true, and the modern Baltimore & Ohio is the lengthened shadow of Daniel Willard.

If the man at the top is a grouch, if he is surly and severe, grouchiness and surliness will permeate the organization from top to bottom. If the "Chief" is fair, frank, friendly and courteous, it will be known from the highest to the lowest, and, while not every employee can "change his spots," it is a powerful incentive for the propagation and cultivation of the same spirit to all who make up the organization.

So, into the Baltimore & Ohio there came the co-operative plan, whereby men and management confer for the purpose of devising better methods and promoting greater efficiency. Up to date, nearly 100,000 suggestions have been made by men in the shops, on the trains and in the offices. All of them received consideration and a majority were adopted.

Each craft has its committee. These committees sit down with the management and all suggestions from the men are weighed. When it is the consensus of opinion that they have merit they are tried out. An example of one of these suggestions which has resulted in large economies is the so-called spot system. Under that plan cars to be repaired are moved along from spot to spot where particular tools and particular materials are assembled. Formerly it was the practice in repairing cars to carry all the materials and all of the tools needed to the car. Under the spot plan many of the economies of the assembly line of the automobile plant are secured.

In 1923 there were established committees on public relations, a central committee in the general offices in Baltimore, with a representative from each of the several departments, and functioning under it a local committee in practically each of the counties of the several States through which the company's lines run. These committees interpret the management's policies to the public and the public viewpoint to the management. They are points of contact. They aid in solving local problems, clear up or prevent misunderstandings and assist in making the Baltimore & Ohio a good neighbor.

These committees also perform a highly important function in acquainting the public with the railroad's point of view. They were particularly helpful in 1923. At that time the railroads just had come through the shopmen's strike and had not had an opportunity to rehabilitate their properties after the wear and tear experienced during the World War and government operation. Railroad executives realized that the country was on the threshold of a period of business expansion. That meant that the railroads had to be put into condition to handle a large amount of traffic. To do so it was

found that an investment of \$1,100,000,000 would be required.

At that time there was fear that Congress would eliminate Section 15a from the Transportation Act, which directs the Interstate Commerce Commission to establish rates which will yield a fair return on the value of railroad properties. It was realized the necessary capital could not be raised unless the investing public were convinced that Section 15a would remain in the law. The public relations committees set out to do their share of the explaining to the public that this clause must be retained if the railroads were to be rehabilitated promptly.

As a result of the explanation of the situation to the public, made by these committees and the various other railroads, each railroad proceeding in its own way, Congress realized that the majority of the people favored the retention of the clause. This was reflected in Congress by the increasing opposition to proposed amendments, with the result that Section 15a was retained. The necessary capital soon was forthcoming which put the railroads of the country in a position to meet the unusual demand for transportation which had been foreseen by the executives.

The central committee in the general offices in Baltimore is composed of six officials, each representing one of the executive departments. That committee, in turn, created the local committees. For the most part those committees are made up of local freight and passenger agents, local counsel, local surgeons and local operating men. These local committees form points of contact with the public. They are ready at all times to hear complaints or suggestions for improving the service.

With the good-neighbor spirit at the top; with it carried along the line; with a public understanding and appreciation of that spirit, naturally the Baltimore & Ohio agents and employees are loyal to and enthusiastic in their work. In the files of every officer are countless letters of appreciation from passengers and shippers, recounting their experiences and telling of special services rendered by employees.

Passengers on Baltimore & Ohio trains are guests not only of the company, but of the men handling the trains. The men not only know that but actually they feel it. They know how a guest should be treated. They do not have to be told. It is instinctive with them. The train crews make every effort to analyze the requirements of each individual passenger. They are careful not to annoy the sophisticated person who might resent their efforts to please, but are more than ready to supply interesting facts about the country through which the train is passing to those who may be making the trip for the first time. A courteous attitude is a requisite for every employee who comes in contact with the public. You know the old story of the office manager who came to the office one morning with a grouch. He assailed his assistant who, in turn, took it out on the next in rank and so on down the line to the office boy who finally landed in the cellar and kicked the cat.

The Baltimore & Ohio does not propagandize its employees, the press or the public. The management believes in a frank and open method of dealing with all three groups. The men down the line know the management's policy. It has been a matter of growth, development and contact.

Information is given the press—not write-ups or stories with advertising value, but information which news-



John J. Cornwell

FOR more than 30 years, John J. Cornwell has been a member of the legal staff of the Baltimore & Ohio Railroad. At present he is general counsel and chairman of the Central Committee on Public Relations. His experience has not been confined to the field of transportation, however, but includes much time devoted to public service. He has served at various times in the Legislature of his State, and was a delegate to several Democratic national conventions. During the years 1917 to 1921 he served as Governor of West Virginia. It was Governor Cornwell who drafted the original resolution creating the committees on public relations of the Baltimore & Ohio. In this article he gives an extremely interesting outline of the policies which the company has followed with notable success in building public good will.

papers may use if they think it is of value to them. The company is a liberal purchaser of advertising space. It does not expect the newspapers to be just as active in getting the railroad's side of the story as they are in securing the other side which may be more sensational or have more news value.

The management believes that lobbying, as known in the old days, is and should be a thing of the past. We think the public is fair, even to a public service corporation, when the public correctly understands the situation. We further think not only that we have a right, but that it is our duty to present to the public the facts as we get and see them, having faith that we will get a fair deal if the facts are properly presented.

This is the ninth of a series of articles by prominent men outside the electric railway industry expressing their views on transportation subjects.



Main Street Façade of the New Norristown Terminal

The elevated footwalk, leading to the second (or waiting room) floor of the terminal, is shown at the extreme right

WITH the dedication of its new Norristown terminal on Nov. 14 and commencement of high-speed service with its new cars the following day, the Philadelphia & Western Railway ushered in a new era in its existence. It follows a program of physical and service betterments that has been going forward for the past two years. Besides the construction of the terminal and cars, the new management, under the leadership of Dr. Thomas Conway, Jr., has made many improvements to the plant, and has completely revamped the fare structure. The dedication and inspection of the new facilities were attended by more than 10,000 residents of the territory served and many sightseers rode the new cars the following day.

The new Norristown terminal is an attractive building of reinforced concrete and steel construction, modernistic in design. The Main Street façade is of sandstone, while the Swede Street exterior is of sandstone and brick. Immediately adjacent to the terminal is the elevated structure by which the trains enter Norristown, to which access is had by an elevated platform constructed as a part of the building.

The large windows on the Main Street side of the waiting room, as well as the third floor of the terminal, are set in a polished aluminum framework which is in large measure responsible for the attractiveness of the building. The first, or street, floor is given up to the Terminal Grille and other concessions. The equipment installed is of the latest design, and the treatment of the interior is artistic. On this floor are a soda fountain,

High-Speed Service

PHILADELPHIA

cigar stand, candy counter and news stand, luncheon booths, telephone booths, individual parcel checking facilities, an order desk for a cleaning and dyeing establishment, and a modern barber shop.

WAITING ROOM LIKE A CLUB LOUNGE

The entire second floor is devoted to the waiting room, ticket offices and restrooms. It is reached by an easy, attractive stairway, and by the latest type self-leveling automatic elevator. The waiting room is distinctive. Instead of the conventional hard wooden benches, it is furnished with easy chairs and divans, attractively grouped as in a club lounge. This furniture is covered with green and taupe leather. The waiting room is wainscoted, and the wall surface above is given a special mottled buff plaster finish. The lighting fixtures are modernistic and are unusually attractive.

For the convenience of Norristown patrons north of Main Street, a practically level elevated footwalk was constructed from grade at Penn Street to the waiting room. It permits patrons to cross Main Street without encountering the hazards incident to crossing at grade, and obviates the necessity for step climbing.

The third floor will be utilized for company offices. While not elaborate, the new offices are attractive and well lighted, and will afford much better working conditions than have been available.

Philadelphia & Western's new cars are designed for operation either as single units or in trains. To understand the problems involved in the design of this equipment, it is necessary to know something of the conditions of service under which these cars are operated.

At the eastern, or city, end of the Philadelphia & Western is the 69th Street Terminal used jointly with the Philadelphia & West Chester Traction Company and the Market Street Elevated-Subway line of the Philadelphia Rapid Transit Company. At this point Philadelphia & Western passengers transfer to the elevated-subway line.

The lines of the Philadelphia & Western extend from the 69th Street terminal 11 miles to Strafford, serving suburban communities along the main line of the Pennsylvania Railroad; and to Norristown, in the Schuylkill Valley (14 miles), served also by the electric suburban service of the Pennsylvania and by the steam suburban service of the Reading. The Philadelphia & Western is a third-rail, double-track, stone-ballasted railroad on private right-of-way, protected throughout by a modern block-signal system. All highway crossings are by overhead bridges or underpasses. Stations are located at

Ushers in a New Era on & WESTERN

Design of New Cars with Radical Improvements was a Major Factor in the Extensive Rehabilitation Program

convenient intervals. All have elevated platforms, obviating the necessity for car steps, and expediting the loading and unloading of trains.

NECESSITY FOR HIGH SPEEDS

When the present management assumed control of the property in the summer of 1930, the electrification of the Pennsylvania Railroad's main line and Schuylkill Valley divisions had resulted in a reduction in the running time of that company's commuter trains to practically all communities in the territory. Between Philadelphia and Norristown the reduction was as much as thirteen minutes. In consequence, seven more minutes were consumed in traveling between these centers on Philadelphia & Western than on the Pennsylvania. With the running time fixed on the subway-elevated from 69th Street to the center of Philadelphia, the Philadelphia & Western was forced to speed up its own service to the maximum extent possible. Hence, the Conway interests, in the fall of 1930, addressed themselves to the problem of designing a new type of car.



Portion of the Waiting Room on the Second Floor

Note the use of comfortable lounges in place of the hard benches of the typical railroad station. The stairways shown in the foreground lead to the train platform

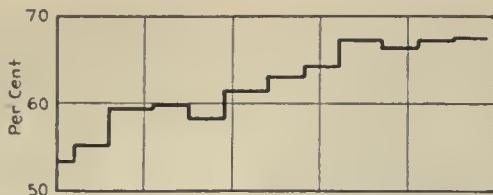
The new management had pioneered with unusually high-speed operation on the Cincinnati & Lake Erie Railroad, also controlled by it. Readers of the JOURNAL are familiar with the operating and physical characteristics of the equipment of that railroad, placed in service in the summer of 1930, and described in ELECTRIC RAILWAY JOURNAL for October, 1930 (Vol. 74, page 614).

As a starting point, one of the Cincinnati & Lake Erie interurban cars was shipped to Philadelphia. In tests made with it many lessons were learned concerning improvements in truck design, and, in collaboration with the J. G. Brill Company, a type of low-level truck was evolved which satisfactorily met the operating requirements on the Philadelphia & Western.

The next step in the design was an elaborate investigation, conducted in the wind tunnel of the University of Michigan under the direction of Prof. Felix W. Pawlowski, to determine the proportionate amount of power needed to overcome air resistance with the con-



P.&W.'s new high-speed cars. A train on the Norristown division—America's first streamlined high-speed suburban equipment

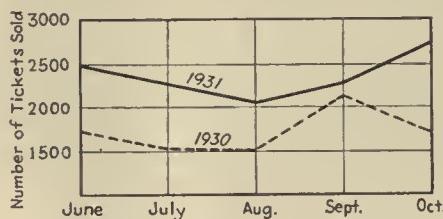


Per cent of total traffic out of Norristown on special one-day and two-day excursions that was handled by Philadelphia & Western, Dec. 2, 1930, to Oct. 27, 1931

ventional railroad coach, at speeds ranging from 10 to 90 m.p.h., and, especially, to determine the type or design, within practical limitations, which would permit of the attainment of the desired maximum speed with the lowest power consumption. The extent to which the various elements of the car, such as roof ventilators, etc., contributed to air resistance and consequent power consumption was given careful study.

Models of various proposed types of car were constructed to scale, each embodying some important difference in design, and so built that various apparatus could be removed. Other changes were made from time to time by the use of wax and putty. All told, 30 types of models were used in the tests. These experiments demonstrated that approximately 70 per cent of the energy consumed by the conventional interurban car, at speeds of 70 m.p.h. or more, was required to overcome air resistance, and that a streamlined car, weighing approximately 52,000 lb., could be constructed which would save 40 per cent or more of the energy required by the conventional type of suburban car, operating at speeds in excess of 60 m.p.h.

So far as is known, the Philadelphia & Western is the first American railroad to apply the lessons of the



Comparison of number of rides between Norristown and Philadelphia sold on twenty-trip and six-trip tickets in 1931, with number of rides sold on 50-trip tickets in 1930, June to October, inclusive

wind tunnel in the actual design and construction of high-speed railroad equipment. Many outstanding features of design and construction are embodied in the new cars. The bodies are fabricated almost entirely of aluminum. Steel is used in the body bolsters and roof carlines; the window sash, storm sash, hand rails and most of the hardware are of stainless steel. The headlinings and interior finish are aluminum. All glass in the vestibules and bulkhead windows is shatterproof.

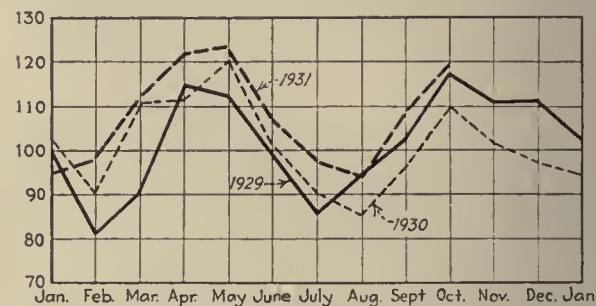
A striking feature of design is the use of a polished aluminum belt rail and skirt which, in conjunction with the streamlining of the car and the brilliant Tuscan red lacquer finish of the car body, creates the illusion of a fast-flying arrow when the car is running at high speed.

The car doors are of the two-fold type. To make them airtight and watertight at high speeds involved unusual construction problems, including the evolution of an automatic air-locking mechanism. Special weather-

stripping in the windows prevents the entrance of water at high speeds.

The absence of external ventilators is a notable feature. Air is drawn in through louvers situated near the doors, distributed through ducts along truss planks, and passed over the electric heaters into the car. The car heaters are divided into two circuits permitting of a variation in the amount of heat with the outside temperature. The heating system is so designed that the electric heaters are cut off while the motors are using energy. By this means, a substantial reduction in the maximum power demand was accomplished. A series of tests conducted by the management last winter demonstrated that even on a railroad of this character, such a heating system is entirely practicable.

Air is exhausted through longitudinal grilles in the

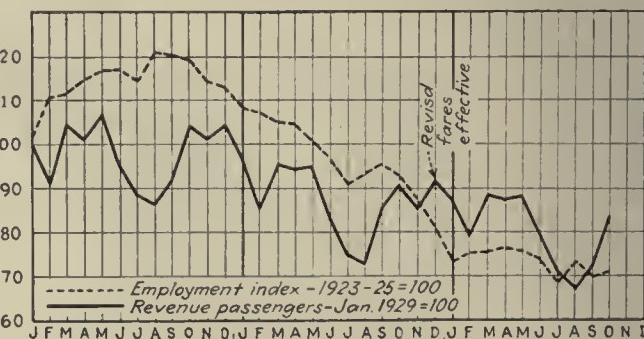


Trend of trips sold, in per cent of January, 1929, of tickets between 69th Street and stations between Wayne-St. Davids and Strafford, January, 1929, to October, 1931

headlining into ducts and thence carried to the rear when the car is in motion and to both ends when it is standing still. This positive ventilation is induced by two electric fans, both of which operate when the car is stationary, while the rear fan runs only when it is moving. In connection with the ventilating system, a new type of ceiling and headlining has been evolved, giving the interior of the car a most pleasing appearance.

In order to reduce to the minimum the time required at terminal stations for train reversal, the cars are wired so that by turning a one-directional switch the marker lights, car platform lights, doorway illuminating lights, door operating control circuit, the fare register actuating mechanism and the headlights are reversed. The cars are equipped with automatic car, air and electric self-centering couplers. Because of the severe braking with high speed and frequent stops, clasp brakes are used.

Full safety features for one-man operation are part of the equipment. In single units the cars are one-man



Comparison of trends in total revenue passengers carried and employment index for Philadelphia of the Federal Reserve Bank

operated; in trains of two or more cars an operator is carried on each car behind the leader, and collects fares and controls the operation of the doors on his car.

The co-ordination of research work performed by various agencies and preparation of detailed plans were under the direction of W. L. Butler, vice-chairman of Philadelphia & Western Railway, who in large measure was responsible for the development of the Cincinnati & Lake Erie high-speed car.

The weights of the various elements of the car are as follows:

Metal underframe and superstructure.....	5,905 lb.
Couplers.....	1,120 lb.
Seats.....	3,140 lb.
Other materials and equipment required to complete car body, such as floor, roof, sash, doors and their mechanism, curtains, ventilating system, heaters, glass, paint, hand brakes, headlights, lighting apparatus, sanders, storage battery, etc.....	11,465 lb.
Total car body, less following equipment.....	21,630 lb.
Trucks (Brill 89-E-2).....	16,390 lb.
Motors (Four GE-706A, 100 hp.).....	10,380 lb.
Control and other electrical equipment (G.E. PC 12).....	2,100 lb.
Air brakes (Westinghouse Traction Brake, MD-33 brake valve, DH-20 compressor).....	1,900 lb.
Total weight.....	52,400 lb.

On Sunday, Nov. 15, new schedules were put into effect, greatly reducing the running time between all points. The time of express trains between the 69th

the changes made were the shifting of braking and electric control apparatus from the right to the left sides of the platforms, permitting easier access by patrons, especially with one-man operation; installation of new safety protective mechanism; lowering of car floors approximately 8 in. through the reconstruction of trucks and changes in bolsters; changes in motor construction, increasing their rating from 60 to 100 hp. each, and increasing the maximum speed on level track from 44 to 70 m.p.h., as well as the rate of acceleration. The reconstruction of trucks, effecting a lower center of gravity, tremendously improved the riding qualities. Seats were widened, and knee room increased; the smoking compartment in each car was abolished; parcel racks were removed and other changes increased the comfort and convenience of the cars.

Service on the Strafford division was also speeded up on Sunday, Nov. 15, the running time of express trains being reduced from 24 to 19 minutes, while the running time of locals was reduced from 28 to 23 minutes.

TRACK IMPROVEMENTS

In preparation for the higher speeds, an extensive program of track betterments was inaugurated last spring. The outside rail on all curves was elevated;



These views bring out clearly some of the striking changes made in modernizing steel cars purchased in 1928-1929

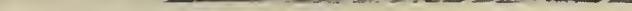
Street terminal and Norristown was cut from 24 minutes to 17 minutes, a reduction of 29 per cent, while the time of other trains between these points was reduced from 28 to 20 minutes. The maintenance of limited train schedules of 49½ m.p.h., making a total of three stops on a one-way trip of 14 miles, establishes new standards of electric railroad operation. Operating tests have shown, however, that although this equipment is not yet run in, the schedule can be made without difficulty, with the trains coasting on the average 51.8 per cent of the total elapsed time on the northbound trip and 71.8 per cent of the time when operating southbound. Nothing more clearly or effectively demonstrates the great advantages of streamlining or the heavy price heretofore paid in high-speed operation by the failure to appreciate the large part which this factor has played in the operating costs of such service.

Careful studies were made to determine whether, from an economic viewpoint, it was preferable to scrap not only the older wooden cars but also some ten all-steel cars purchased in 1928 and 1929. It was decided that while these cars were not suitable for operation on the Norristown division, it was not only advisable but desirable to modernize them for use on the Strafford division, paralleling the main line of the Pennsylvania Railroad. A comparison of the pictures reproduced of the exteriors of these cars before and after modernization shows how greatly their appearance has been improved. Among

wherever necessary, ties were replaced with treated ties; new ballast was installed where required; a number of block signals were moved to meet the requirements of faster operation; all station platforms were lowered to accommodate the low-level cars; new running rails were installed on the Norristown bridge, and other like changes were made. This program, now completed, assures not only smooth and comfortable track but also safety of the track structure.

A trip over the property is sufficient to convince any one that the Philadelphia & Western is in the forefront of American high-speed suburban railroads. The equipment now used in regular service is either brand-new or of the modernized type described. Schedule speeds are among the fastest now prevailing in America. The management is confident that these service improvements will result in a substantial increase in the traffic and revenues. The Philadelphia & Western traveler can now make as good, and in some instances much better, time to and from Philadelphia than on most of the trains operated by the competitive steam railroads.

As a city terminus, the Market Street Elevated-Subway line furnishes unusual advantages. There is a subway station in every large department store in Philadelphia, and most of the large office buildings, as well as the Broad Street subway, can now be reached by the Broad Street underground concourse. This is particularly advantageous in inclement weather. These two rapid



transit systems afford access to practically every section of Philadelphia, and provide an incomparable network of high-speed urban transportation for the Philadelphia & Western's patrons.

For a number of years the traffic and revenues of the road had progressively dwindled. In the twelve months ending July 31, 1930, immediately prior to the advent of the new management, the total number of revenue passengers carried was 21½ per cent less than in the corresponding period ending in July, 1926.

A comprehensive traffic and economic survey made by the management in 1930 led to the conclusion that the progressive horizontal percentage increases in rates of fare made at various times in the decade ending in 1927 had driven away much traffic; that many of the restrictions on the use of multiple-trip tickets were irksome to patrons and contrary to the best interests of the company; that a thoroughgoing revision of the entire rate structure was necessary, and that new and different types of tickets should be instituted and aggressively merchandised in order to attract new business and regain lost business. In addition, with one-man operation it seemed desirable to eliminate the use of pennies, since approximately 47 per cent of the total revenue passengers were paying cash fares.

RADICAL CHANGES MADE IN THE FARE STRUCTURE

The outstanding changes in the tariffs, made effective on Nov. 16, 1930, or exactly one year prior to the inauguration of faster service with the new equipment, may be summarized as follows:

1. Minimum cash fares between any two points on the property are 10 cents, as contrasted with a previous minimum of 7 cents. On the other hand, passengers can ride for 10 cents distances theretofore costing from 12 to 16 cents.

2. The graduation of cash fares in accordance with mileage was abandoned. Both cash and ticket rates between 69th Street and nearby stations were considerably increased. On the other hand, such rates between 69th Street and more remote stations were substantially decreased, some as much as 37½ per cent.

3. Half-fare tickets for children were re-established.

4. In place of the ten-trip tickets theretofore sold, the sale of six-trip strip tickets, each coupon being good for use by bearer, was begun, the cost per trip in most cases being considerably less than the ten-trip ticket rate.

Fifty-trip tickets were abolished and twenty-trip tickets substituted, the cost per trip in general being substantially reduced. In addition, the privileges were greatly liberalized. Whereas the 50-trip ticket could be used only by the purchaser, the twenty-trip ticket could be used by any number of people traveling together.

On 60-trip monthly commutation tickets a rate of 8½ cents per ride was substituted for the graduated rate prevailing between 69th Street and most stations on the property, the purpose being to remove the fare barrier against the expansion of suburban development and thus aid in building up the outlying sections.

Round-trip excursion tickets good for use within two days, between Norristown and Philadelphia, were placed on sale at an attractive rate much below that formerly prevailing. This step was not only deemed desirable from the standpoint of promoting traffic, but was also necessary in order to meet a similar rate (but without the two-day feature) instituted by the Reading some months before the Conway interests assumed control of Philadelphia & Western. The volume of traffic riding on this ticket has shown a steady and substantial increase from month to month. The portion of the total traffic purchasing one-day or two-day round-trip excursion tickets riding on Philadelphia & Western is shown in the accompanying graph.

It was recognized that these changes in rates would initially result in a substantial reduction in revenue.

While this was a grave step to take in a period of industrial depression, the management recognized that the reattraction of lost traffic and the development of new business was a task covering a period of years. It was believed desirable to undertake this without delay, offsetting the resultant loss in revenues by the introduction of operating economies.

CONFERENCES WITH LOCAL EDITORS AND CIVIC ORGANIZATIONS TO DISCUSS POLICIES

Prior to the announcement of impending changes in the fare structure, President Conway, at a dinner conference with the editors of the local newspapers, frankly and fully outlined the economic problems which the property faced; the nature of and reasons for the fare revisions contemplated, and the correlation of these revisions with the ambitious plans for service betterments. Out of this conference and subsequent contacts have grown up very friendly relations between the newspapers and the company, resulting in intelligent treatment of news with respect to current developments on the railway.

Concurrently with the announcement of fare changes, the company, through paid advertising and through its house organ, *P&W News* (regularly distributed on its cars and to an extensive mailing list), told why changes were necessary, and what the Philadelphia & Western planned to do. The company makes extensive and regular use of newspaper advertising in merchandising its service. A representative group of officials of the many civic organizations in the communities served were taken on a special trip over the property in the Cincinnati & Lake Erie interurban car, and at that time an explanation was made by the management of the steps which were being taken to evolve, if possible, an even better car for the local requirements.

In consequence of this policy, the extensive readjustment in the rate structure was made without any serious public friction. The relations between the company and its patrons have steadily increased in cordiality.

INTERESTING STEPS IN CREATING NEW CLASSES OF TRAFFIC

Subsequent to the general revision in fares, a number of interesting innovations have been made, and have proved successful. Among these are:

1. During the summer of 1931 a joint ticket was sold by Philadelphia & Western in conjunction with the Wilson Line, operating fast excursion steamers on the Delaware River, affording a pleasant all-day or evening sail on the river at a very attractive rate of fare. A substantial amount of business of this character was developed, particularly in Norristown.

2. A station was established, used only for this purpose, near the Stadium of Villanova College. With the co-operation of the athletic association and the authorities of that institution, the use of the Philadelphia & Western in traveling to and from the Villanova games has been popularized.

3. In July last the sale of unlimited-use weekly commutation tickets was begun between Norristown and 69th Street simultaneously with the inauguration of a like ticket by the Pennsylvania Railroad. Shortly thereafter, the Reading Railroad put on sale a similar ticket. This ticket has proved very popular with Philadelphia & Western patrons, and has led to a substantial increase in commuter travel out of Norristown.

4. In the fall of 1931, Philadelphia & Western, in collaboration with the Tower Theater, at 69th Street, inaugurated a special joint ticket, placed on sale at Villanova College, entitling its students to a round trip between Villanova and 69th Street and admission to the Tower Theater. The cost of this ticket is no greater than the admission charged at the nearest neighborhood movie. A substantial amount of traffic has resulted. While the rate is comparatively low, it represents new business, filling seats which otherwise would be empty.

German Railway Installs Trolley Buses



This modern vehicle is the first trolley bus of current type to be installed in Germany

ALTHOUGH Germany claims the first trolley bus, built nearly 40 years ago, it was only in August, 1930, that the modern trolley bus made its appearance in that country. The installation is on a suburban route between Mettman and Gruiten, and was made as an experiment by the Rhenish-Westphalian Electric Company, owners of the local street railway system. The route is 5.77 km. (3½ miles) long, and is through very hilly country, only 165 ft. of the entire distance being level, and the grades being as high as 11.1 per cent. The road is quite crooked, 32 per cent of the distance having curves with radii as short as 12 m. (40 ft.). The population is sparse, Mettman being a city of 12,000 and Gruiten a village of 3,000, with slight development between. The trolley bus installation replaces a portion of a bus line, which was installed some two years previously, and which proved unprofitable. The portion electrified has the greatest possibility of development, and it is hoped to make the line self-sustaining.

The line is operated with two vehicles, the chassis of which were built by the Krupp works of Essen and the bodies by the Waggonfabrik of Uerdingen. The buses are six-wheeled, and are driven by a single motor, rated at 89 kw., 750 volts, 1,400 r.p.m., mounted with its shaft longitudinal. It is supported by lugs resting on the side frames of the chassis. The motor drives a differential, also mounted on the frame, and through it power is transmitted by means of short shafts and a gear train to the four rear wheels. The speed reduction is 11.8:1, and the maximum vehicle speed is 28 m.p.h.

Control is through a master switch actuated by the driver's foot. He can adjust the speed by varying the pressure on the pedal, the power being cut off automatically by a spring release when his foot is removed. Control is of the resistance type, ex-

cept that the field is shunted on the last position. A second pedal controls the Lockheed hydraulic brakes, which act on all six wheels. In addition there is a hand brake, acting on the four rear wheels only through a system of levers. This combination of brakes assures positive control and safety on the severe grades encountered along the route.

The bus seats 30 passengers on upholstered cross and longitudinal seats, with fifteen additional standing places. A rack for baggage replaces the seat adjacent to the front door. One-man operation is provided for, passengers entering at the front and leaving at the rear. The front door is controlled by levers, while the rear door is closed electrically. Each trolley bus weighs 8,200 kg. (18,000 lb.). Its length is 9.34 m. (30 ft. 7 in.).

Power is supplied over four contact wires, two for each direction. On the straight sections these are suspended from side brackets made up of curved tubes forming a bow by which the wires are separated by strain insulators. On some of the curved parts of the line, the same construction is used, and at places suspension insulators are substituted. On the sharper curves, span construction is the rule. Both wood poles and lattice steel poles are used. For turning, there is a loop at one end of the line, and a wye at the other. In a few sections such as a railroad underpass, the route is served

by a single pair of contact wires. At such points automatic switches are placed in the overhead. Current is taken off by means of two trolley poles with wheels mounted in swiveling harps. The bus can deviate from the center of the overhead as far as 4.5 m. (15 ft.) on either side without losing contact with the wires.

All of the electrical material for the installation was furnished by the Allgemeine Elektrizitäts Gesellschaft, of Berlin.



Turning out to pass another vehicle on a narrow road

MUNICIPAL TRAMWAY TAXATION

THAT MUNICIPAL TRAMWAYS in Great Britain are taxed in the same way as private undertakings is the contention made in a letter recently received from J. Beckett, general secretary the Municipal Tramways and Transport Association, who takes issue with a number of statements made in the article by John Spargo published in the September issue of ELECTRIC RAILWAY JOURNAL. A copy of Mr. Beckett's letter was forwarded by this paper to Mr. Spargo, who accepts the correction, but points out that the principles enunciated in his article are in no way affected. Both these letters are published here for the information of the many readers of the JOURNAL who are keenly interested in this important subject.—EDITOR.

Situation In Great Britain Misrepresented

THE MUNICIPAL TRAMWAYS AND TRANSPORT
ASSOCIATION

3 & 4 Clement's Inn., Strand,
London, W. C. 2
Oct. 19, 1931

To THE EDITOR:

I read with interest and astonishment the article by John Spargo in your September issue, on the ancient theme of government in business. With interest, because it recalls a dead controversy in this country. With astonishment, because some of his statements are quite baseless and untrue, and, while they may mislead some ill-informed American readers, they unconsciously tell your British readers that he talks without the book.

He says that in his search for the difference, in their financial results, between municipally and privately owned systems of transport, he has been "digging below the surface," and has made some startling discoveries! Shortly stated he declares: (1) That municipalities may escape the heavy charge for paving, repairing and maintenance of the streets between the tracks, whereas it has to be borne by the operating company; and (2) that the last-named pays a large sum in taxes to the city, whereas the municipal system is untaxed, apparently on the theory that it would be absurd for the local authority to tax itself. Let me say that such a theory is unknown in Great Britain.

He goes on to say: "It is the universal practice to exempt municipal enterprise for taxation," and adds that this is "not only true of America, it is equally true of Great Britain. . . ." This misrepresentation is my

justification for writing to you. The fact is that so far as this country is concerned, there is not a vestige of truth in it. Mr. Spargo's digging has been, apparently, unprofitable.

Every public utility service operated by local authorities is taxed, both imperially and locally, and transport undertakings are rated and taxed in precisely the same way as are company transport systems, and under the same laws. I will give you a few examples. The amounts paid for rates and taxes last year were as follows:

Tramways—Birmingham, £93,269; Bradford, £14,873; Glasgow, £159,247; Leeds, £41,784; Liverpool, £74,680; London County Council, £148,488; Manchester, £47,848.

The total amount paid by all the Local Authorities' tramways systems in Great Britain for rates and taxes for the year 1929-30, as shown by the Return of the Minister of Transport, was £997,939.

With regard to road maintenance, I will quote the Tramways Act, 1870. Notwithstanding the present use of the roads by vehicles not even dreamed of 60 years ago, the obligation is still the law and enforced upon municipal and private companies alike. Section 28 of the act enacts as follows:

The promoters shall, at their own expense, at all times maintain and keep in good condition and repair, with such materials and in such manner as the road authority shall direct, and to their satisfaction, so much of any road whereon any tramway belonging to them is laid as lies between the rails of the tramway and (where two tramways are laid by the same promoters in any road at a distance of not more than 4 ft. from each other) the portion of the road between the tramways, and in every case so much of the road as extends 18 in. beyond the rails of and on each side of any such tramway. If the promoters abandon their undertaking, or any part of the same, and take up any tramway or any part of any tramway belonging to them, they shall with all convenient speed, and in all cases within six weeks at the most (unless the road authority otherwise consents in writing), fill in the ground and make good the surface, and, to the satisfaction of the road authority, restore the portion of the road upon which such tramway was laid to as good a condition as that in which it was before such tramway was laid thereon, and clear away all surplus paving or metalling material or rubbish occasioned by such work; and they shall in the meantime cause the place where the road is opened or broken up to be fenced and watched, and to be properly lighted at night: Provided always, that if the promoters fail to comply with the provisions of this section, the road authority, if they think fit, may themselves at any time, after seven days' notice to the promoters, open and break up the road, and do the works necessary for the repair and maintenance or restoration of the road, to the extent in this section above mentioned, and the expense incurred by the road authority in so doing shall be repaid to them by the promoters.

The magnitude of the cost of this burden is illustrated by the following figures, showing the cost last year of giving effect to the section quoted above in the cities mentioned, *viz.*:

Repairs and Maintenance of Permanent Way—Birmingham, £69,975; Bradford, £24,263; Glasgow, £136,957; Leeds, £29,582; Liverpool, £51,900; London County Council, £162,902; Manchester, £57,882.

The total charge for the same purpose to the Local Authorities in Great Britain for the year 1929-30 was £1,349,968.

The author of this article is obviously a blind guide in the field of transport. It will interest your British readers in general, and the writer in particular, to learn how he came to fall into such egregious errors on matters of fact which can be so readily verified.

J. BECKETT (F.S.A.A.),
General Secretary.

John Spargo's Reply

Old Bennington, Vt.
Nov. 3, 1931

TO THE EDITOR:

The point that I tried to make in my article in the September issue of your paper was that statistical arguments on the subject of the relative merits of government versus voluntary enterprise in business are practically irrelevant; that there is a principle involved which is not materially affected by such statistical comparisons. I made it quite clear, I think, that even if the statistical arguments were conclusive in demonstrating that government operation was cheaper and equally efficient, the argument against government competition with private citizens in business would not be materially weakened. That was my main contention. Quite incidentally, I made certain observations concerning the well-known fact that statistics on this subject are notoriously misleading. I called attention to the fact that it is a common practice for municipal enterprises in this and other countries to be exempted from important charges which in the case of privately owned public service corporations constitute part of their fixed charges. Taxes and interest on bond issues are among the most important of these. Quite carelessly I added that the exemption of municipal enterprise from taxation in this country, is "equally true of Great Britain." Mr. Beckett is quite right in denying the latter statement, which I would not have made if the point had been of any importance to my article, or other than an incidental observation *inter alia*. I accept the correction gladly, and in turn beg to offer some corrections to Mr. Beckett.

When Mr. Beckett says that every public utility service is "taxed, both imperially and locally, and transport undertakings are rated and taxed in precisely the same way as are company transport systems, and under the same laws," he tells the truth, nothing but the truth, but not the whole truth, I think. No one can read the "Report from the Joint Select Committee on Municipal Trading," 1900, for example, without realizing that, in practice, there is serious discrimination in favor of municipal enterprises.

Mr. Beckett cites at

some length the Tramways Act of 1870 upon the point of the cost of road maintenance between rails, but he is not really so naïve as to believe the theory of this act and the common practice are in agreement. He is well aware, I feel certain, of the abuses which have repeatedly occurred due to the veto power of the municipality under the act. Will Mr. Beckett turn to Question 1203 in the report of the Select Committee above referred to and note the forced payment of £5,000? Will he turn to Questions 1517 to 1531, inclusive, and note the testimony of W. M. Murphy? When the chairman of the Select Committee demanded a "specific instance" of unfair and oppressive terms demanded by a municipal authority, quite beyond the scope of the Tramways Act of 1870, as cited by Mr. Beckett, Mr. Murphy complied by citing the case of Dumbarton where the municipality demanded as a condition that "in addition to the ordinary terms as to the paving of the streets" that a large block of buildings at a corner of a street be taken down.

It would be easy to fill an entire issue of ELECTRIC RAILWAY JOURNAL with testimony of the highest competence proving that the Tramways Act of 1870 which Mr. Beckett cites, despite the apparent fairness of its terms, has, through the veto power which it gives to municipal authorities, severely hampered the development of electric traction in Great Britain, especially interurban traction, and been made the instrument of discrimination against private enterprise. It has been a source of corruption and practices which my old friend John Burns, M.P., described as "almost on the verge of blackmailing" and "a scandal in the past" and "a disgrace to the present." I respectfully refer Mr. Beckett to the full text of this speech by John Burns. He will find it in Hansard's Parliamentary Debates, May 15, 1902.

I refer Mr. Beckett, further, to the evidence given before the Royal Commission upon the "Means of Locomotion and Transport in London," 1905. He will find the testimony of the Right Honorable James W. Lowther, later Speaker of the House of Commons, upon the effect of the famous Standing Order No. 22, by which the veto of the local municipal authorities is maintained. Mr. Lowther asserted that the veto power "has been most improperly used for the purpose of extorting all sorts of terms and conditions from tramway companies, and had subjected them to liabilities and disabilities which were never contemplated by Parliament." It is certainly well known to Mr. Beckett that even when Parliament has definitely refused its sanction to certain

conditions tentatively agreed to by operating companies and municipal authorities, and voted to delete such provisions from Private Bills, as they are called, the obligations thus voted out of the bills are still imposed upon the companies as a condition of their existence. Refusal on the part of the companies to abide by conditions which Parliament has deliberately rejected and refused to sanction would bring about the use of

*Beginning with the issue of January, 1932,
the name of*

ELECTRIC RAILWAY JOURNAL

will be changed to

**TRANSIT
JOURNAL**

A detailed announcement appears on the first editorial page of this issue

the municipal veto. The practical effect is a levy upon the private enterprise which can be called either extra-legal taxation or blackmail, as is chosen.

Mr. Beckett cites the provision of the Tramways Act of 1870 relating to road maintenance. What he is eloquently silent about is the practice which imposes upon private companies much heavier obligations of road maintenance than the act prescribes, in some cases, as in the Metropolitan London area, requiring the companies to pave the entire street. Municipal systems, on the other hand, are required only to pave and maintain the roadway in conformity with the provisions of the act. Moreover, in not a few of the Private Acts, so called, based upon provisional orders under the Tramways Act of 1870, there are conditions such as no municipal system has to meet. I cite the well-known case of the Lea Bridge, Leyton and Walthamstow Tramways Act, under which the company had to undertake to pay the greater part of the cost of widening a road, a project which had been before the Board of Works for years before the tramway was even proposed. This is a fairly common form of extra taxation imposed upon private business.

For 40 years and more I have been interested in the growth of municipal enterprise in Great Britain. I do not know anything definite of the work of the Municipal

Tramways and Transport Association which Mr. Beckett represents, except that it is one of a class of organizations which have managed to acquire a very great power in English politics, a power which many of the most capable statesmen have deplored and held to be fraught with danger to the nation. I refer to such bodies as the Municipal Corporations Association and the Association of Urban District Councils. Such organizations, to a much larger extent than has been generally recognized here, have been responsible for the tremendous extension of municipal trading, with all the chain of evil results ensuing therefrom.

Mr. Beckett refers to the "ancient theme" of government in business, and tells us that it "recalls a dead controversy" in his country. His letter reached me on the same day as the news of the unexampled revolt of the British electorate against the Labor Party, and today, just as I began to write this letter, word came that the revolt against Socialism in the British municipalities which began last year has been continued this year. The returns indicate that the masses of the British people are aroused and have determined to put an end to those collectivist policies which have brought the nation to such a deplorable state. The "dead controversy" seems to be a very lively corpse!

JOHN SPARGO.

Transportation Not Neglected in City Planning Study at Harvard

HARVARD UNIVERSITY
CAMBRIDGE, MASS., Nov. 18, 1931

TO THE EDITOR:

A friend has called to my attention, with much ribald glee, your editorial in the November number of the ELECTRIC RAILWAY JOURNAL, entitled "Misplaced Emphasis in City Planning."

Since Harvard is the only "large Eastern university, listing a total of 24 courses of study" in this subject, I am probably safe in assuming that you refer to the Harvard Graduate School of City Planning.

As to your first paragraph, I heartily agree with you, that, in city planning, beauty cannot be sought for its own sake alone. I should say, however, that beauty is a flavor integral with the cake or an intelligent mixing and baking, rather than an icing which might be later applied to make salable a cake inwardly nasty or indigestible.

In the rest of your editorial you make the following statements as to the Harvard teaching:

"Two important courses deal with horticulture and plants." In fact these courses require not 2/24, or more than 8 per cent, of the total time of the student as apparently you inferred, but only 3.5 per cent; and of this time two-thirds is devoted to design in lines and masses of trees in cities. This does not seem a very unreasonable allotment when you consider that usually in smaller towns there are many more trees than houses, and that the trees are probably rather the better looking!

"Another course embraces the history of Mediaeval, Renaissance and modern art." Apparently you are doubtful of the value of such information to a city planner. Personally, I think that some little knowledge of the esthetic accomplishments of the past is worth while for anyone who is at least partly an artist, and merits our allotment of 1.9 per cent of the student's time.

"Nowhere is any consideration given to the relationship between transportation facilities and civic development." I am sorry if any blindness of statement in the pamphlet led you to this surprising conclusion. In any case, the facts are quite otherwise. Out of a total of more than 5,000 working hours required to be devoted to the whole curriculum, about 370 working hours or 7.3 per cent are usually devoted primarily to transit and transportation. Since it is practically impossible to study any major city planning problem in the school without taking into account transit and transportation, we do not feel that this side of the subject is badly neglected.

The case being as I have stated it above, naturally there remains little ground for your inference that "no previous instruction having been given on the subject of transportation, the student apparently is expected to sketch in a few routes at random, and call the result a community transit system." Twenty years of experience in instruction in city planning have, I hope, taught us better than this. But nevertheless, we would not have a student of ours believe that, with all our regular instruction, he was fitted to design a working transit system. Transit design is a field in itself, worthy of a man's whole time and requiring highly specialized training. We are trying to teach city planning as a whole. Therefore, we ask our students to think of transit and transportation in their relation to the places reached, and the people and things carried, i.e., as one of the many interrelated community services to which they can give, in their limited course, only its due proportion of their time.

Since you have hardly given a fair picture of the work of the Harvard school, I am asking you, as a good sport and a man interested in co-operation in city planning, to print this letter as you printed your editorial.

H. V. HUBBARD
Chairman, Harvard School of City Planning.

By B. P. LEGARÉ

Engineer of Maintenance of Way and Construction
Market Street Railway
San Francisco, Cal.

Rebuilding Track Under Heavy Traffic

Efficient mechanical and labor organization was developed by Market Street Railway of San Francisco to work under particularly severe conditions. A job ordinarily requiring three or four months was completed in 24 working days

RECONSTRUCTION of 8,136 ft. of single track on Market Street, San Francisco, was recently completed by the Market Street Railway. On this street there are four tracks, the outer two belonging to the city and the inner two of the Market Street Railway. The headways are short on all of the four tracks, making it impracticable to use ordinary methods of reconstruction, without seriously delaying service and thereby greatly inconveniencing the traveling public, and, incidentally, losing a large amount of local business.

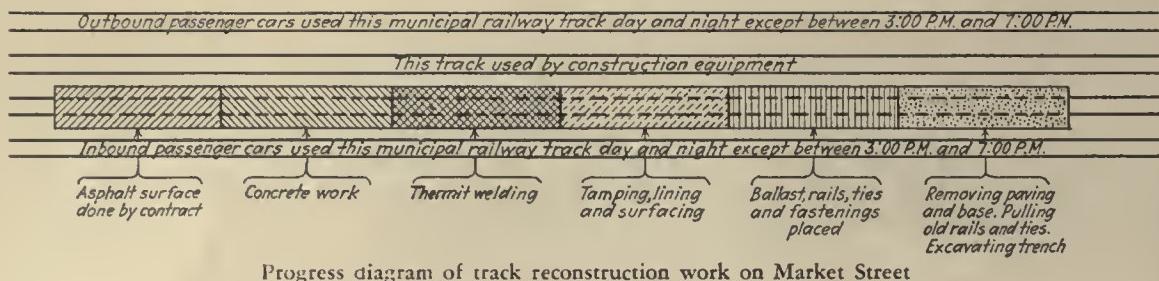
Track construction methods previously employed involved the use of portable crossovers. On account of the number of cars on this line, the distance between crossovers necessarily had to be short, thus making the cost excessive, and delaying the conclusion of the undertaking, as only a limited number of men could work simultaneously on the job. To overcome this difficulty, a plan was worked out whereby the Market Street Railway operated over the city's tracks, except during the afternoon rush hours, special crossovers being installed for this purpose at the ends of the section being rebuilt.

The city's tracks were used on a rental basis per car-mile. Because the city did not have power supply sufficient for the Market Street Railway's cars in addition to its own, the line was sectionalized. The city then furnished current for all cars for one section and the Market Street Railway furnished it on the other section.

The plan adopted worked without any inconvenience



Large crane with A-frame removing old rails on Market Street, San Francisco



Progress diagram of track reconstruction work on Market Street

to the traveling public, and permitted the work being done in 24 working days instead of taking from three to four months. To accomplish this, the organization had to function like clockwork, with every man on his toes. On account of the large number of men out of employment during this period, an unusually intelligent class of labor was available. Although most of the men were new at this particular kind of work, they needed only to be shown and to get accustomed to it. The way they worked and the good results accomplished created favorable comment from every one.

CONSTRUCTION SUSPENDED DURING RUSH HOURS

Before commencing the reconstruction, four 9-in. paved crossovers were installed, two at each end of the job. These were used to switch the Market Street Railway's cars from the inner to the outer tracks, for twenty hours from 7 p.m. one day to 3 p.m. the next day, except on Saturdays and Sundays. Just before 3 p.m. each day, the new and old inner tracks were reconnected so cars could operate on the new track from 3 p.m. to 7 p.m., these being the rush hours when it was deemed inadvisable to attempt to operate the cars of both lines over the same rails.

Section insulators were installed on the trolley wires to separate the two sections. Electric recorders counted the number of Market Street Railway cars running on outside tracks. A map was made showing the location of section insulators, and the exact distance in miles from crossover to crossover on each outside track and from section insulator to section insulator, this distance being used for figuring all car-miles.

Four knuckle-joint spring switch mechanisms were installed at the "point-on" end of each crossover, and one flagman and one switchman were stationed at each end, making a total of four during the time cars were running on outside tracks. The flagman was furnished by the operating department and the switchman by the engineering department. The city police department was notified before any cross streets were blocked, and officers were sent to the blocked crossing to handle traffic. The blocking was for a few hours only, and, as soon as rail was laid on ties, temporary tie crossings were installed so traffic could cross.

The old track, built in 1909, consisted of 9-in. 141-lb.

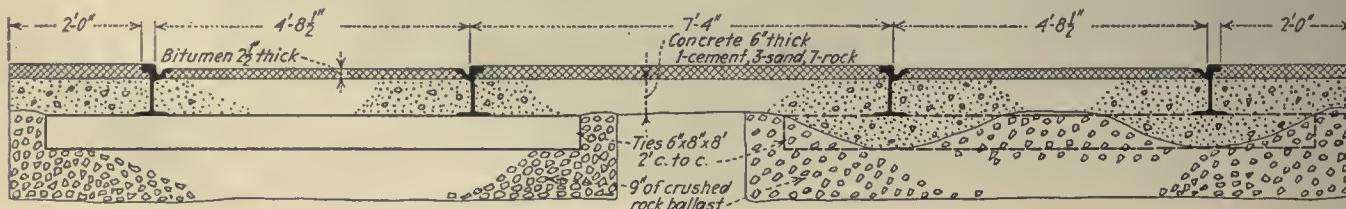
grooved rail, with wood ties on 9 in. of ballast. The original paving was 2½ in. of asphalt on concrete foundation. On account of many years of repairs most of the concrete had been cut out along the rails, and 6 in. to 7 in. of asphalt used in its place. For this reason it was possible by using an "A" frame to pull the rails out, leaving the ties in place without first breaking up the concrete. The new construction consists of 9-in. 121-lb. grooved rail, new wood ties, 9 in. of new ballast, thermit joints, and 2½ in. of asphalt surface on concrete.

The inbound track was built first for its full length, the outbound track being used for a work track for the construction cars and derrick. After the inbound track was completed, the outbound track was built in the same way, using the new inbound track for a work track. The job was handled by a day force and a night force, the day force consisting of approximately 95 men working from 6 a.m. to 3 p.m. with half an hour off at noon time for lunch, and the main night force from 8:30 p.m. to 6 a.m. The derrick car worked from 7 p.m. to 6 a.m. The total night force was approximately 50 men, making a total of 145 trackmen not including car crews and paving men. This force was supervised carefully and a few men added or subtracted according to the progress of the work.

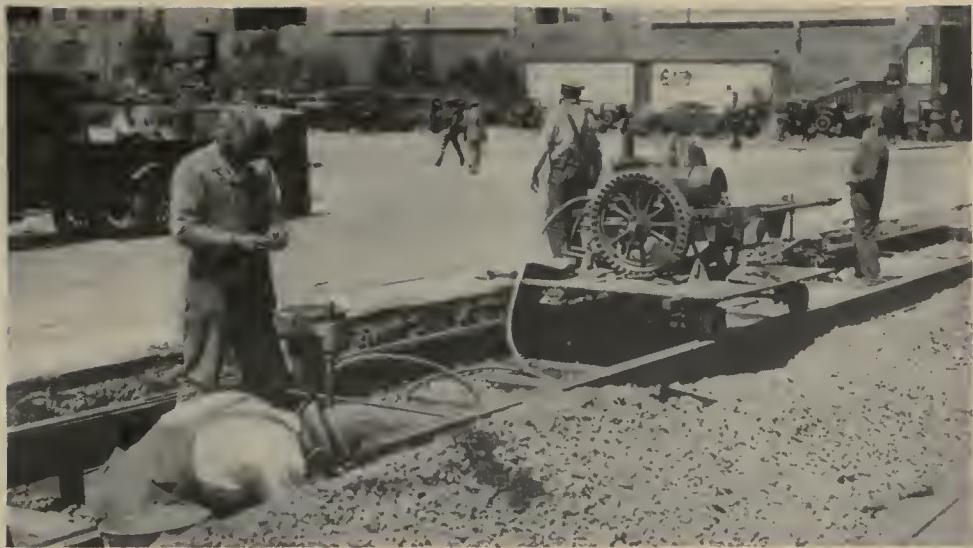
RAILS LAID DURING DAY SHIFT

The derrick started pulling up track with an "A" frame at 7 p.m., and after pulling about 100 ft. of track, lifted the rails out of the trench, so when the main gang arrived at 8:30 p.m. the paving had been broken up and was ready to be shoveled into the cars. The derrick continued pulling track and dragging rails out of the trench until 200 ft. of track had been torn up. Later if sufficient progress had been made in digging the trench, more track was pulled so that the day crew, starting at 6 a.m., could begin loading cars immediately.

No track was laid at night, the work at that time consisted only of track pulling, excavating and loading in cars and hauling from the job the cleanup material, old rails and old ties. Three dump cars were used, two usually being on the job and loading, while one was in transit. About 30 to 35 men were employed in excavating and loading these two cars. All cleanup material from the ditch was hauled 4 miles to a dump where it was



Cross-section of new track on Market Street, San Francisco



All joints of reconstructed tracks were thermit-welded. Welding apparatus was mounted on a small movable truck

pushed over a bank by an unloader and spreader crane. This work was done both day and night.

During the day a force of from 30 to 35 men excavated and loaded material on the cars in the same manner as the night crew. Two concrete breaker outfits, each consisting of two men and a compressor, worked with the night gang, and the same number with the day gang, breaking concrete along the edge of the trench. They also loosened the earth and old ballast in the trench. Both the night gang and the day gang had an outfit for cutting rails, tie rods and joint bolts.

The rail laying gang of two spiking crews and the tie laying men followed the excavating gang, laying in the 8½-hour period from 6 a.m. to 3 p.m. the full run of

excavated track, and made the final connection with the old rails just before 3 p.m.

A center cab car loaded with new ties remained all day on the new track behind the rail laying gang so the ties were handy to be placed in the trench by the derrick. The ties, when loaded on this car, were placed in lots of about 40 each, with a space under them and a space between each load so the derrick cable could easily be passed around the bundle for lifting it off the car. A similar car loaded with enough new rail for one day's work also remained on the job near the rail laying gang, in a location convenient for the placing of the new rail on the new ties by the derrick. Tie plates and tie rods were carried on the rail and tie cars. Before placing the



To supply air for pneumatic tools, a large compressor was mounted on a work car and portable gasoline compressors placed at the curb

ties in the trench, dump cars poured crushed rock in the trench behind the excavating gang and men spread it so the rails and ties, when laid, were a couple of inches below grade.

The line and grade engineers started work at 6 a.m. each day and placed stakes at the side of the trench behind the excavating gang. A mark was made on each stake 16 in. below grade, this being the desired height to which rock was to be spread. The ditch was dug 9 ft. wide and 2 ft. deep, depth being measured from the paving adjacent to the rails alongside the trench.

Behind the rail laying gang came eight air tie tamper outfits. When the tamper gang started on the job it was about 1,000 ft. behind the excavating gang, but at the finish this distance had been reduced to approximately 750 ft. This outfit consisted of eight air tamper men, four feeder men, two other men and one foreman, a total of fifteen men. Ahead of and behind the tamper gang was a hand tamper gang of twelve to fourteen men, doing the preliminary track raising ahead of tampers and the final lining and tamping behind the tampers and directly ahead of the concrete gang. The same gang also attended to the installing, changing and removing of temporary tie crossings. The tamping outfit worked at the rate of about 360 ft. of single track for the 8½-hour day. The air compressor and tool box were kept on a construction car behind the tamping gang, and moved up as the work progressed. This compressor was able to run six tampers at 70-lb. pressure. Two additional tampers were supplied with air by a gas-driven compressor standing at the curb and delivering air to tampers by an "over the trolley wires" hose outfit. Two of these hose outfits were used. The overhead lines department changed them every day so one hose was always set up ahead.

Close behind the tamper gang came the thermit-weld outfit, welding joints at the rate of about two per hour.

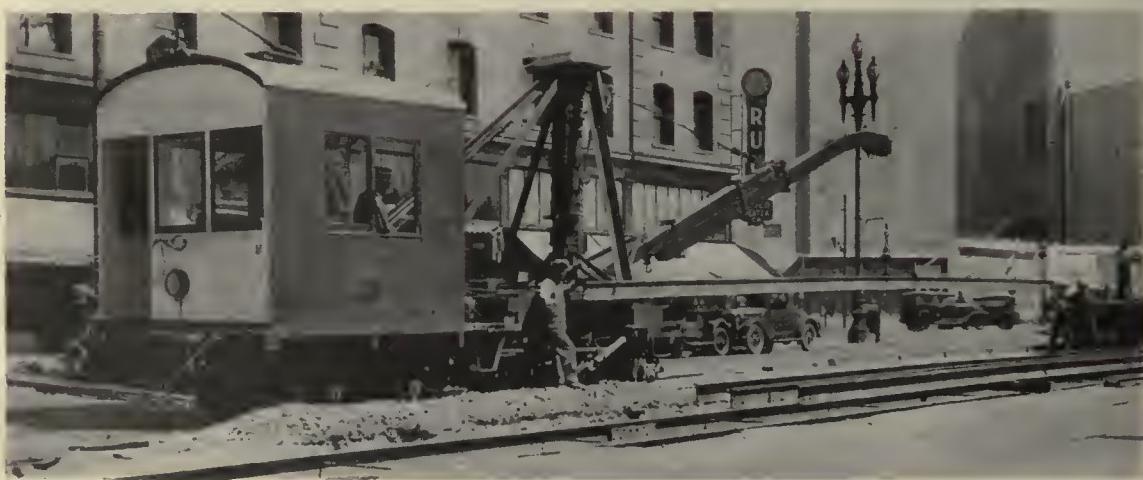


Premixed concrete was used for the paving base with asphalt for the surface

weld while still hot with a cold chisel, leaving very little metal to be filed smooth. Two wheel tool boxes were part of this welding outfit.

The concrete gang followed the welders, placing premixed concrete delivered in 4-cu.yd. trucks, which dumped the concrete into a chute across the rails, depositing it in the trench. This gang worked nearly every day preparing the pockets under the rail for concrete and placing the concrete. Three trucks were used and eight men laid the concrete at the rate of approximately 360 ft. per day. After the concrete had set two days, the asphalt was laid by a contractor, a day's run varying from 8,000 to 16,000 sq.ft. Before laying the asphalt, the concrete base was cleaned and painted ahead of the asphalt gang by Market Street Railway men.

The total number of passing cars registered during the 24 days when all cars ran on the two outside tracks was 64,320. This is equivalent to 2,680 cars per day, or an average for the twenty hours during construction of 67 cars per hour on each track. Although vehicles were operated at short intervals on both sides of the tracks being reconstructed, with clearance of only 2½ ft. between them and the edge of the ditch, there was only one accident during the entire undertaking. This was occasioned by an auto driver, who was speeding during the early morning hours.



A large crane mounted on work car was on hand at all times for pulling rails, handling ties and placing new rails

Form Designed for *Standardized Analysis of Claims Statistics*

Comparison of claims figures on equalized bases, full information of costs for one company and a proper comparison of data from any other property are afforded

REALIZING that "figures do lie" when the information they convey is incomplete, or is founded upon improper premises and can result in mistaken and erroneous conclusions, the Mid-West Claim Agents' Association, at its recent convention in Denver, made a definite contribution toward the ultimate standardization of claims statistics. The form, given here in detail, and an explanation of it were presented to the association by Charles L. Carr, general solicitor Kansas City Public Service Company. Mr. Carr's discussion of the form is the basis of this article.

Reference to the form consists of seven main subdivisions—namely: operating statistics, accidents, claims, lawsuits, trials, expenditures, and injuries and damages statistics—compared and equalized. It has spaces for entering figures for the current year and the preceding year. The first division, operating statistics (1 to 16), sets forth all passenger car-mile and revenue figures for both railway and bus lines which are needed for computing averages. Miscellaneous statistics of the community or area served also are included to give a general picture of the nature and volume of the particular service.

The subdivision on accidents (17 to 28) gives details on accidents of all classes, both in total and on a mileage basis, in such form that they may be used in a later subdivision in comparing claim statistics.

Claims (29 to 36) comprise the next subdivision. The number settled, the aggregate amounts paid to claimants and the average amount paid per claim settled are given. The items both exclude and include compensation claims, because the latter are scheduled amounts in which there is no element of negotiation, and because some companies might not be under compensation.

Lawsuits (37 to 54) include the number and amounts of such suits pending and filed during the year, and the increase or decrease for the year. The data show whether or not the particular company is disposing of its I.&D. potential liability as expressed in lawsuits to the same or to a greater or lesser extent than is charged or set up against the company in new lawsuits filed. This is very important in ascertaining the particular company's yearly

potential liability and in equalizing the I.&D. expenditures for the year as between companies. Figures on lawsuits dismissed, settled prior to verdict or judgment, or disposed of, with the average amount paid, are of particular interest for comparative purposes.

The importance of the information contained in this subdivision as a guide to departmental efficiency is more fully understood when it is realized that claims become actively dangerous only when presented in the form of lawsuits, and that the departmental efficiency in handling claims (presented as such) is, in general, measured by the number of lawsuits filed. If proper claim settlements are not made, increased lawsuits result. Lawsuit data, therefore, are a very important guide to claim efficiency.

Trials (55 to 65) include judgments, hung juries, demurrers to evidence sustained, non suits, dismissals during trial, and aggregate amounts paid on judgments. The previous statement with respect to lawsuits filed measuring claim efficiency applies equally to trials as measuring efficiency in the prior handling and settlement of lawsuits. If proper lawsuit settlements or proper preparation for trial be not made, trials will result in adverse verdicts and judgments, increasing I.&D. expenditures, all to the detriment of the particular company, and this will be registered in the above trial statistics.

Included under expenditures (66 to 69, 35 to 49) are the amounts paid for salaries and to outside attorneys, and the I.&D. expenditures. The last-mentioned figures are used in the next subdivision as a basis in comparing and equalizing I.&D. statistics.

Under the heading "I.&D. Statistics—Compared and Equalized" (70 to 81) is the meat of the entire form, the prior subdivisions being preliminary in supplying data and in painting a general picture. Three bases for comparing injury and damage statistics are used—namely: (1) percentage of total I.&D. expenditures to passenger revenue (which is not approved except as equalized as hereinafter explained); (2) I.&D. cost per passenger car-mile, both actual and equalized; and (3) average total cost per public accident and all accidents, both actual and equalized.

Three equalizing factors are used in this subdivision in connection with the above bases to make a fair and proper comparison of I.&D. statistics between various electric railway companies. These are: first, the equalization of lawsuit settlements on a basis of one year's potential lawsuit liability for the respective companies; second,

the equalization of passenger revenue per passenger car-mile; and, third, the equalization of public accidents per passenger car-mile.

The reasons back of the above three equalizing factors are as follows: First, with regard to the equalization of lawsuit settlements on the basis of one year's potential

Operating, Accident and Claim Statistics

Operating Statistics

1. Population in community or area served.
2. Miles of track (single) in vehicular traveled thoroughfares, public streets and roadways.
3. Miles of track (single) on separate right-of-way, public or private (excludes barn and yard trackage).
4. Passenger car-miles—railway and bus.
5. Passenger car-miles—railway.
6. Passenger car-miles—bus.
7. Passenger revenue—railway and bus.
8. Passenger revenue—railway.
9. Passenger revenue—bus.
10. Passenger revenue per passenger car-mile—railway and bus.
11. Passenger revenue per passenger car-mile—railway.
12. Passenger revenue per passenger car-mile—bus.
13. Reserve for I. & D. per car-mile—railway.
14. Reserve for I. & D. per car-mile—bus.
15. Average number of street cars operated (week day p.m. rush).
16. Average number of buses operated (week day p.m. rush).

Accidents

17. Accidents, all classes—railway and bus.
18. Accidents, all classes—railway.
19. Accidents, all classes—bus.
20. Public accidents (other than to employees only)—railway and bus.
21. Public accidents (other than to employees only)—railway.
22. Public accidents (other than to employees only)—bus.
23. Accidents, all classes per 1,000,000 car-miles—railway and bus.
24. Accidents, all classes per 1,000,000 passenger car-miles—railway.
25. Accidents, all classes per 1,000,000 passenger car-miles—bus.
26. Public accidents (other than to employees only) per 1,000,000 passenger car-miles—railway and bus.
27. Public accidents (other than to employees only) per 1,000,000 passenger car-miles—railway.
28. Public accidents (other than to employees only) per 1,000,000 passenger car-miles—bus.

Claims—Railway and Bus

29. Number of claims (other than employees' compensation claims) settled.
30. Aggregate amount paid to claimants (other than to employees on compensation).
31. Average amount paid per claim settled (excluding compensation claims).
32. Number of employees' compensation claims settled.

33. Aggregate amount of compensation paid to employees for injuries.
34. Number of claims settled (includes compensation claims).
35. Aggregate amount paid to claimants (includes compensation claims).
36. Average amount paid per claim settled (includes compensation claims).

Lawsuits

37. Lawsuits pending beginning of year—number.
38. Lawsuits pending beginning of year—amount sued for.
39. Lawsuits filed—number.
40. Lawsuits filed—amount sued for.
41. Lawsuits dismissed (no payment to plaintiff)—number.
42. Lawsuits dismissed (no payment to plaintiff)—amount sued for.
43. Lawsuits settled prior to verdict or judgment—number.
44. Lawsuits settled prior to verdict or judgment—amount sued for.
45. Lawsuits settled prior to verdict or judgment—aggregate amount paid.
46. Lawsuits settled prior to verdict or judgment—average amount paid.
47. Lawsuits disposed of—number.
48. Lawsuits disposed of—amount sued for.
49. Amount paid to plaintiffs and their attorneys (includes judgments paid, No. 64).
50. Average amount paid per lawsuit disposed of.
51. Lawsuits pending at end of year—number.
52. Lawsuits pending at end of year—amount sued for.
53. Increase or decrease in lawsuits pending—number.
54. Increase or decrease in lawsuits pending—amount sued for.

Trials

55. Judgments for plaintiff—number.
56. Judgments for plaintiff—amount.
57. Amount sued for in suits resulting in judgments for plaintiff.
58. Judgments for defendant—number.
59. Amount sued for in suits resulting in judgments for defendant.
60. Hung jury—number.
61. Hung jury—amount sued for.
62. Demurrs to evidence sustained, non-suits, and dismissals during trials.
63. Judgments for plaintiff paid—number.
64. Judgments for plaintiff paid—amount of judgments.
65. Judgments for plaintiff paid—amount sued for.

Expenditures

66. Salaries of law department (I. & D.) (claims and lawsuits).
67. Compensation outside attorneys (I. & D.).

68. Expenses of law department (I. & D.) other than settlement of claims and lawsuits, salaries and compensation of attorneys (excludes 35, 49, 66, and 67).
69. Total expenditures of law department (I. & D.) (claims and lawsuits) (includes 35, 49, 66, 67, and 68).

I. & D. Statistics—Compared and Equalized

70. Percentage, total actual expenditures law department (I. & D.) to actual passenger revenue ($69 \div 7$).
71. Total expenditures, law department (I. & D.) equalized re lawsuits. (Actual expenditures decreased by cost of excess lawsuits [more than filed] disposed of at average cost per lawsuit disposed of (53×50) or increased by average cost per lawsuit disposed of times increase in number of lawsuits (50×53)).
72. Percentage, total expenditures equalized re lawsuits (71) to passenger revenue (7).
73. Same as 72 for K. C. P. S. Company, but other company equalize passenger revenue on basis of passenger revenue per passenger car-mile of K. C. P. S. Company. Other company = other company $71 \div (K. C. P. S. Company 10 \times \text{other company } 4)$.
74. Same as 73 but other company equalize expenditures in ratio of number of public accidents per passenger car-mile. Other company = (other company $73 \times K.C.P.S. Company 26 \div \text{other company } 26$).
75. I. & D. cost per passenger car-mile.
76. I. & D. cost per passenger car-mile equalized re lawsuits as above ($71 \div 4$).
77. Same as 76 but other company equalize expenditures in ratio of number of public accidents per passenger car-mile. Other company = (other company $76 \times K.C.P.S. Company 26 \div \text{other company } 26$).
78. Average total cost per public accident (excluding compensation to employees) regardless of number of claims involved in any one accident ($69 - 33 \div 20$).
79. Average total cost per public accident equalized re lawsuits as above ($71 - 33 \div 20$).
80. Average total cost per accident (including claims of and amounts paid to employees for injuries) regardless of number of claims involved in any one accident ($69 \div 17$).
81. Average total cost per accident (including claims of and amounts paid to employees for injuries) equalized re lawsuits as above. ($71 \div 17$).

lawsuit liability. If a fair comparison of I.&D. expenditures is to be made between companies, it should be made not upon the actual expenditures, but upon the basis of the particular year's potential liability. This can be best approximated and measured by the number of lawsuits filed against the particular company in the given year. If a company has disposed of more lawsuits than were filed during the year and has thus increased its expenditures, it should not be penalized for so doing, and its actual expenditures should be reduced to the extent of the excess liability disposed of. This should be measured by the particular company's experience in connection with the average amount paid per lawsuit disposed of, multiplied by the excess number of lawsuits disposed of.

If on the other hand, a particular company has disposed of less lawsuits than were filed during the year and has thus decreased its expenditures, it should not be favored for so doing and its actual expenditures should be increased to the extent of the excess liability not disposed of. This should be measured by the particular company's experience in connection with the average amount paid per lawsuit disposed of multiplied by the excess number of lawsuits filed. No company should be permitted to stand by and not settle or dispose of its I.&D. liability, and then be congratulated for its efficiency, or lack of it.

Second, with regard to the equalization of passenger revenue per passenger car-mile. If I.&D. expenditures are to be compared on the basis of passenger revenue per passenger car-mile, each company should not be permitted to use its own and varying passenger revenue per passenger car-mile, but all companies should be required to use the same passenger revenue per passenger car-mile so that this figure will be the same and not a variable. It is submitted, that if passenger revenue is to be used as a guide, it should be figured on the same passenger revenue per passenger car-mile, and multiplied by the number of passenger car-miles that the particular company operates.

Third, with regard to the equalization of public accidents per passenger car-mile. If a comparison is to be made between claim and legal (or law) departments of various electric railway companies to be advised as to their relative efficiency, the variable of the number of public accidents per passenger car-mile on the lines of the various companies should be eliminated, and the particular number of public accidents per passenger car-mile of one of the companies should be adopted as the common unit for all companies. The claim department should not be penalized because the transportation department of that company has been so fortunate as to have a lesser number of public accidents per passenger car-mile than other companies. The department handling injury and damage matters should be judged by its own conduct, and not by the happenings in other departments.

With the above in mind, consider now the three bases mentioned for comparing injury and damage statistics.

First, percentage of I.&D. expenditures to passenger revenue. From what has been stated it seems absurd to make any comparison based upon the percentage of actual I.&D. expenditures to actual passenger revenue, a comparison that is based upon two variables. Item 70 of the form sets out this particular percentage, not with

any idea of giving it approval, but merely as a starting point from which to figure the percentage of I.&D. expenditures equalized, in regard to lawsuits and in number of public accidents per passenger car-mile to passenger revenue equalized on the basis of the passenger revenue per passenger car-mile.

Second, I.&D. cost per passenger car-mile. The basis of I.&D. cost per passenger car-mile is an accurate and fair basis of

comparison of I.&D. statistics. When the basis is equalized with respect to lawsuits as above outlined and is also equalized on the basis of the number of public accidents per passenger car-mile, it becomes a very accurate and just basis of comparison.

Third, average total cost per accident. If a comparison is to be made between departments of various companies handling I.&D. matters, it is held that the most accurate basis of comparison (where the departments to be compared operate under compensation laws with regard to employees injured) is the average total cost per public accident (excluding compensation to employees) equalized with regard to lawsuits.

Also included in the form is the average total cost per accident (including claims of and amounts paid to employees for injuries) both actual and as equalized in respect to lawsuits, for comparison with those companies that do not operate under workmen's compensation laws.

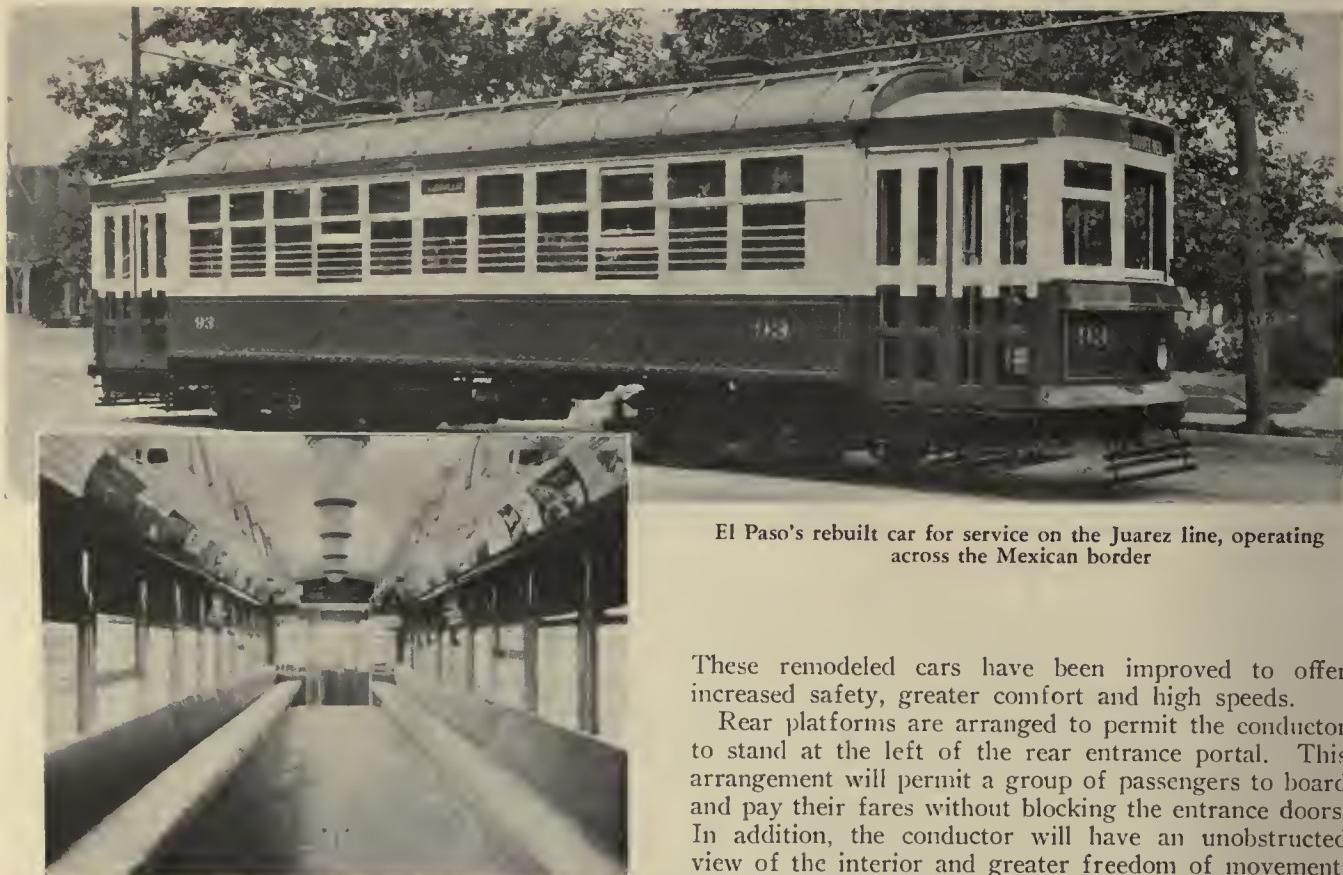
Commercial Drivers Will Compete For Safety

SAFETY will be the determining factor in a contest among commercial vehicle drivers, which is to start on a country-wide basis on Jan. 1, under the auspices of the National Safety Council. Sixteen divisions have been made among members of the Delivery, Taxicab and Bus Section of the Council according to the business engaged in. Buses, public utilities and taxicabs are included. Two prizes are to be awarded in each division, one to the larger and the other to the smaller fleet making the best no-accident record during a half-year period.

The contest will close on June 30, 1932. The winners of each group shall be the units having the lowest number of accidents per 100,000 vehicle-miles (or vehicle-hours if so decided by the division).

Rules governing the contest have been compiled by a special committee from the Delivery, Taxicab and Bus Section of the National Safety Council, of which A. E. Lundsteadt, Bowman Dairy Company, Chicago, is chairman.





El Paso's rebuilt car for service on the Juarez line, operating across the Mexican border



Spacious aisles will facilitate customs inspection at the border line

El Paso Rebuilds Cars for Greater Safety and Speed

By J. E. LAWLESS
Master Mechanic
El Paso Electric Company

MODERNIZATION in El Paso calls for the complete rebuilding of cars in shops fully equipped for the work. Thus far plans have been confined to the remodeling of twelve double-truck cars for the lines serving Juarez, Mexico. This equipment was formerly in use on city lines, where service is now being furnished by Birney cars. The Juarez line is the only line of the El Paso Electric Company with two-men operation, made necessary by the requirements of customs inspection at the Mexican border.

Eight of the remodeled cars are now in operation, having been rebuilt at a cost of \$1,000 each. Work on the remaining cars is progressing rapidly, and they are being turned out of the shop at the rate of one per week.

These remodeled cars have been improved to offer increased safety, greater comfort and high speeds.

Rear platforms are arranged to permit the conductor to stand at the left of the rear entrance portal. This arrangement will permit a group of passengers to board and pay their fares without blocking the entrance doors. In addition, the conductor will have an unobstructed view of the interior and greater freedom of movement. Front and rear doors are equipped with automatic treads. The old cars had high platforms with two steps, and manually operated doors. On the remodeled cars the exit doors will open only when the car has come to a full stop and will not close until the passenger has left the step. A signal light in front of the motorman will inform him whether the doors are closed or open.

The dead-man control will insure safe operation. The motorman must hold the controller handle down, or keep his foot on the foot controller in order to keep the car running. Unless this is done the power will be cut off and the brakes will be set automatically. Mirrors placed inside the car will permit the motorman to see approaching passengers who wish to alight at the front end. A single-stroke electrical signal bell of an improved type has been installed. This bell is independent of the passenger signal bell, and represents a decided advance over the old-type bell cord running through the car.

The cars have $\frac{7}{8}$ -in. hardwood flooring, covered by $\frac{1}{2}$ -in. Celotex insulation and $\frac{3}{8}$ -in. battleship linoleum. This type of floor reduces the noise reaching the interior of the car and is easy to keep clean. Comfortably upholstered longitudinal seats have been installed to facilitate the work of customs inspectors.

Ample illumination is provided by six dome-type lighting fixtures, extending through the center of the car. The dash is lighted by five 56-watt lamps, mounted under the belt at each end of the car and placed in a covered-type reflector made of 60-gage metal. These lights are completely concealed to eliminate all direct glare. The entire front dash of the car is illuminated by these lights, creating a pleasing effect.

The exterior is painted with an attractive color scheme of red, white and blue. The interior is finished in mahogany enamel, with a white enamel ceiling. All lettering and striping is done in gold.

By S. S. Cook
and C. Brockman

Westinghouse Electric &
Manufacturing Company



Air-blast transformer recently supplied to the Reading Company for its Philadelphia electrification

Progress in

RAILWAY TRANSFORMER DESIGN

IN THE development of transformers for railway service, designers have endeavored continuously to reduce the weight without sacrificing reliability. Some of the things which have contributed largely to the reduction in weight are: (1) use of structural steel end frames; (2) use of structural steel coil bracing; (3) cutting the corners off the punchings; (4) omission of the metal housing around the punchings. As an example of what has been accomplished in weight reduction, a 360-kva. transformer built in 1916 weighed 6,630 lb., while a similar 405-kva. transformer built in 1930 weighed 5,775 lb. This represents a decrease in pounds per kilovolt-ampere of $22\frac{1}{2}$ per cent.

Railway transformers for locomotive and motor car service are similar in design, the only differences being the size and method of mounting. Locomotive transformers are mounted in the cab, while motor car transformers are suspended beneath the body.

Some of the earlier single-phase railways used small oil-insulated self-cooled transformers. Being built between 1902 and 1906, before the advent of welding, cast-iron tanks were standard practice, with vertical ribs cast on the outside of the case. Since the transformers had to be mounted under the car, a long low tank was necessary. Using the standard shell-type construction, the transformer coils were placed in a horizontal plane.

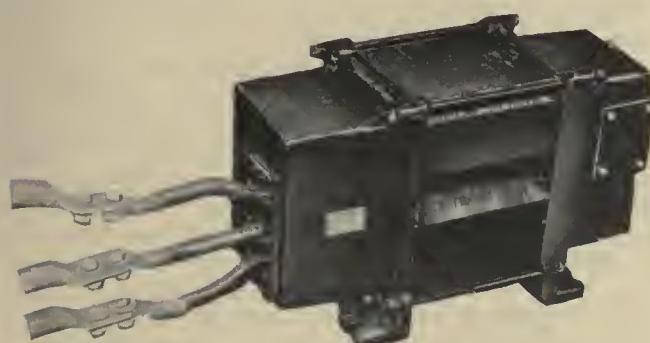
Though this simplified the connections and made it possible to bring the leads out through the cover where there was least chance of oil leakage, it made the oil duct horizontal and retarded natural oil circulation.

As the horsepower of the motors increased, space limitations would not permit the use of natural cooling for the larger transformers required. With the adoption of 11,000 volts on the contact line, the air blast transformer was chosen. For a given rating the air-blast transformer, including its blower and blower motor, is smaller and lighter than any other type for this voltage class. Also, with the air blast transformer the leads may be located where most convenient to the car wiring.

On the first New York, New Haven & Hartford installation, each motor car had its own air-blast transformer, rated at 450 kw., single phase, 25 cycles, 11,000 to 648 volts at full load. A number of taps gave lower voltages for acceleration points and for the compressor and blower motors, heaters and lights. To keep the reactances approximately the same on all taps, the low-voltage winding was designed with full voltage per group of coils and all groups were paralleled by connecting similar leads to a common bus bar instead of being wound with full current per group and all groups in series. This practice still is standard in this country.

Insulation design of the early railway air-blast transformers was based on stationary practice. Since the accumulation of dirt, a large part of which is brakeshoe dust, is inherent to railway service, either its entrance had to be prevented or the transformer designed to withstand a reasonable amount. The latter course was chosen as the more reliable and the electrical clearances considerably increased.

Coils of the earlier transformers were wound of double cotton-covered copper conductors with heavy paper insulation between turns, then pressed to size and taped. After treatment in insulating compound they received more layers of cotton tape and further treatment in compound. The finished coil had good dielectric strength but was weak mechanically. The spacing strips would settle into the tape, practically closing the air ducts.

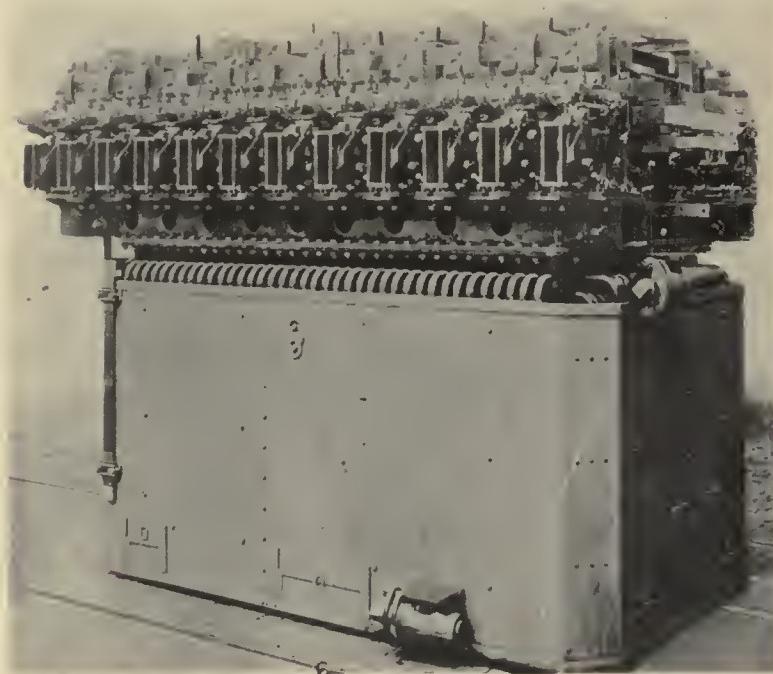


Typical preventive coil of modern design

Some improvement was made by a final treatment in insulating varnish after putting on the last layer of tape, and the method was used for several years.

About 1913, treatment of the coils in synthetic varnish was started. By 1917 the practice was adopted which has become standard. The coils are wound with heavy insulation between turns. They are pressed to size and treated according to the following method: (1) dipping in synthetic varnish; (2) pressing between steel plates and baking; (3) wrapping with several layers of cotton tape; (4) dipping in synthetic varnish; (5) pressing between steel plates, with a layer of paper on each side to give a smooth surface, and baking; (6) dipping in clear varnish enough times to give a good gloss, baking after each dipping.

Coils of modern transformers are separated by wavy



European transformer of 2,250-kva. rating for use on 15,000-volt system

spacers, and are assembled in groups surrounded by the well-known box-type fullerboard insulation. The wavy spacers support each conductor, but allow the cooling air to come in contact with both sides of each coil. One or more fullerboard washers give ample insulation strength between high and low voltage coils and between coils and iron. Wavy spacers placed all around the coil assembly provide air ducts for cooling the iron. The coils are braced to withstand the mechanical strain of a short circuit on any low-voltage tap with full voltage maintained on the high-tension winding. To seal and weatherproof the coils and insulation, the assembled transformer is given several dips in varnish and is baked after each dipping, thus cementing the component parts into one solid mass. The disadvantage of somewhat increased cost of repair is more than overcome by the prevention of independent vibration, reduction in noise, and lessened likelihood of loosening of parts when subjected to the continuous vibration incident to railway service.

Laminated-steel punchings, insulated to reduce eddy current losses, always have been used for the magnetic circuit. The corners are cut off so as to maintain uni-

form cross-section of the magnetic circuit and to provide a place for tie rods. At first the magnetic circuit was entirely covered by a metal housing bolted to the end frames as a protection against the weather. When the practice of dipping the complete transformer in baking varnish was adopted, the metal housing over the punchings was no longer necessary.

In 1923 some of the railways wished to provide for future increase in trolley potential to 16,500 or 22,000 volts. For this voltage class, the insulation clearances for air transformers become large, thereby increasing the dimensions and weight to such an extent that an oil-insulated, forced-cooled transformer will have approximately the same weight and dimensions and a somewhat greater thermal capacity.

Transformers supplied to the Virginian Railway are typical of this development. These are rated 2,350 kva., 25 cycles, single phase, with high voltages of 11,000 or 22,000 and low voltage of 1,500 with the necessary notching taps. The core and coils are similar to those of any standard oil-insulated transformer, except for dipping in varnish, and more elaborate core bracing. A false cover or baffle plate mounted inside the case slightly below the oil level prevents splashing. The leads pass through this cover through bushings, and current transformers and other auxiliary apparatus are mounted on it. Both the oil inlet and outlet are at the bottom of the tank and piped on the inside, so that the cold oil enters at the bottom of the tank near the center and the hot oil is drawn from the top. The hot-oil outlet pipe is at the side of the case just far enough below the minimum oil level to prevent its being out of the oil when the locomotive sways or goes around a banked curve. The transformer is cooled by forced circulation of 117 gal. of oil per minute through a suitable radiator, which, in turn, is cooled by a blast of 6,000 cu.ft. of air per minute.

Preventive coils, which are used in connection with control equipment to permit change from one control tap to the next without interrupting the current, are small auto-transformers. The first ones, being small, were self-cooled and the coil ends were totally inclosed with end bells. As the capacity of the preventive coils increased, screens were inserted in the end bells, allowing air to circulate around the ends of the coils. With further increase in capacity it was necessary to resort to artificial cooling, and since blowers were available, the air blast type was used. The forming and treatment of the coils, and the assembly and treatment of the insulation, are the same as those of the main unit.

European practice tends toward higher trolley voltages, and so oil-insulated, forced-cooled, air blast transformers are used extensively. A recent typical transformer of this type is rated 2,250 kva. in summer and 2,650 kva. in winter, the additional capacity being used for train heating. It is single-phase, 16 $\frac{2}{3}$ cycles, 15,000 to 629 volts, with suitable notching taps. This transformer is of the shell type of construction and the main transformer and three preventive coils are placed in the same tank. The switch groups and all connections are mounted on top of the tank cover. The tank is of welded boiler plate with external cooling tubes.



Interlocking connections at the Hammersmith Station in London are controlled from this board

London Underground Railway

MODERNIZES SIGNAL EQUIPMENT

MODERNIZATION of signaling equipment on the London Underground Railways has been in progress for some time. The work involved includes replacement of the original direct-current track circuit apparatus by alternating-current apparatus of the condenser fed type. All relays are being equipped with removable tops fitted with spring-loaded terminals, the bottom portion of which makes contact with studs on the fixed top of the relay. These tops, by means of which a relay can be changed without interference with its wiring, were developed on the underground railways in order to avoid delays. While the change of a relay due to a faulty contact is very infrequent, the delay to traffic is serious with a $1\frac{1}{2}$ -minute train service, particularly on the tube railway sections where a man cannot remain in the tunnel while trains are running. With the removable top a relay can be changed in 30 seconds without errors in wiring which are liable to occur where many wires have to be transferred. These tops, introduced in 1927, have been of such benefit that they have been adopted as standard.

Circuit breaker boxes have been installed at train stops, and wiring alterations have been made to indicate that signals and train stops have correctly operated to danger.

Power interlocking frames have been completely overhauled, including replacement of all contacts by an entirely new and improved type, whose contact portions

Alternating-current equipment replaces the old d.c. system. New type of interlocking tower adopted to facilitate inspection

are chromium plated and polished. These are surrounded by bakelite partitions and slotted bases to prevent any pieces of wire or other metal lodging across the contacts and completing a circuit incorrectly. Visuals are also provided for the signal and point levers, and where a train stop is operated by a move from the opposite direction, a visual is also provided.

Relay rooms are being rewired, and in several of them new-type metal relay racks are installed. Care has been taken to improve the run of cables and to make the wiring neat and orderly to assist general maintenance and reduce the possibility of accumulation of dirt.

In connection with the western extension of the Piccadilly Railway, now being constructed, and the consequent alterations to the platform at Hammersmith, a new signal cabin was built, incorporating the latest developments. On account of the limited area available alongside the tracks, the new two-story cabin has been built on top of the adjoining retaining wall on the south side of the Metropolitan District Railway westbound platform. The top floor comprises the signal cabin, line-men's depot, lavatory and a small locker room. The



Access to a gallery beneath the board is obtained through a door in the end of the cabinet



The relay room is directly beneath the signal cabin. A ladder leads to the gallery below the control board

lower floor is used as a relay room. The building is of a different design from the usual signal cabin, the amount of window space being considerably reduced. The center window projects so that the signalman can, if necessary, look out in either direction.

The interior of the cabin is finished with tiles with filleted corners at the bottom of the walls and round the frame. The frame casing has been extended to form a booking desk and to accommodate the telephone switchboard, as well as to cover over the entrance to a platform under the locking frame.

The Underground company some years ago developed the plan of providing an opening in the floor of the cabin under the locking frame, with a platform below so that the maintenance men might stand upright, thus facilitating maintenance of contacts, magnets, etc. This platform is also reached by steps from the relay room. The arrangement is now incorporated in all signal cabins where practicable.

The locking frame at Hammersmith was an old one rebuilt for the purpose. The leg castings were dispensed with, and the sections fixed on steel joists, with the ends supported at the back of the frame by means of a wall built up from the cabin floor and tiled on the outside.

The switchboard for various signaling main cables is in the signal cabin portion of the building, but no live parts are exposed. The back of the board with the connections is in the adjacent linemen's depot and is covered by a cabinet. This result is made possible by the use of "back of board" switches with operating handles on the front. In the lower portion of the board are four circuit breakers of the Igranic type for the cabin trans-

formers and ring mains. The signalman cannot trip them, but is able to reset them if they are tripped.

Considerable thought was given to the arrangement of the relay room fittings, especially in connection with fire prevention and with a tidy arrangement of cables and wiring. The relay racks are accessible from each side and have been designed to give as little area as possible for the settlement of dust. The uprights are formed of angles. On the horizontal bars attached to them are screwed cross-pieces for supporting the relays. The underside of this support is bent to carry the U-shaped supports to which the removable tops of the relays can be hung when it is necessary to change a relay.

The wires are taken along the back of the rack in aluminum hooks, and the wires lead down to one side of the relay top and lie flat, the ends of the wire at the terminal being covered by a small insulating collar. Relays on the shelves are of different colors, in accordance with a standard coloring scheme adopted by the company, so that a relay can be immediately recognized as to its operating voltage and class, i.e., track, line or point indication.

The fuses are supported on small section channels, the racks being sloped in order to economize space by giving the greatest accommodation either at the bottom or top as required by the incoming or outgoing cables. A number of the track circuits in the vicinity of the cabin are fed from the cabin through isolating transformers and condensers which are housed in the relay room.

The work of changing over from the old cabin to the new one was carried out in one night of about six hours without any delay or rearrangement of traffic. All the work was carried out by the company's own staff.

Analysis of Maintenance Costs on 43 Properties

Operating

287,082,000 Car-Miles

and

58,595,000 Bus-Miles

EXPENDITURES for maintenance consume a large part of the revenue obtained by the electric railways every year. If the maintenance dollar could be made to accomplish more than it does at the present time, a large sum would be added to the net income of the industry. It is for this reason that an analysis of the data submitted by 43 electric railways in the competition for ELECTRIC RAILWAY JOURNAL'S Maintenance Contest Award for excellence in maintenance work during the year 1930 is presented here. No attempt is made to draw any definite conclusions from the figures presented nor to show any relation between cost and performance, or any of the other factors considered, but it is believed that they are worth careful study from which individual companies can make their own comparisons and conclusions. To the companies which are scrutinizing their maintenance costs as a result of the present demand for a reduction in expenditures, this information should serve as a valuable guide, and a check for any cost analysis they may undertake. The information compiled does not cover the entire industry, but it does cover a good part of it, as indicated by the comparisons in the first table. The average figures obtained are close approximations to those for the industry as a whole. It is believed that this detailed compilation of maintenance costs is the largest in size and number of operations that has been made in recent years.

During 1930 electric railways spent more than \$214,000,000 for maintenance of way and of equipment, this figure representing about 21 per cent of the total gross revenue. Viewing this large item of cost in another light, of the 7.77 cents collected for each fare, using A. S. Richey's figure for the average fare in the United States during 1930, 1.63 cents was needed to meet the cost of maintenance. With the magnitude of these figures in mind, possible savings to the industry resulting from a careful cost analysis of maintenance work by all companies loom large.

The range of the variations of cost for the companies in the contest is clearly shown in the charts. They appear large enough to make us believe that some companies are not getting the full

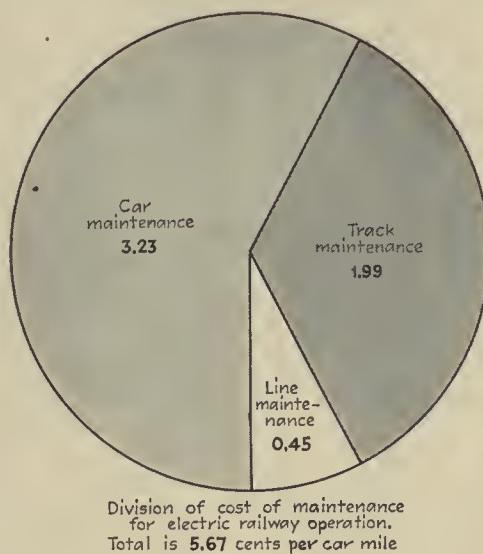
value of their maintenance dollar. Why should there be differences of as much as 300 per cent between the low and high figures in these various items of maintenance cost? If some companies have been able to reduce their

cost to a low figure, other companies should be able to approach that figure. That there are uncontrollable factors that enter into the cost of some companies is realized. These may be differences in wage rates, local conditions, franchise requirements, etc. Nevertheless, a careful cost analysis of maintenance expenditures would show up leaks in the maintenance budget of many companies.

A cost analysis of itself will not reduce maintenance expenditures, but it will show how to accomplish a reduction by indicating where each maintenance dollar is spent, and what it is accomplishing. Comparisons with results achieved by other companies in the industry will point out where any company is falling behind the general average for the industry. A decrease of 10 per cent in the industry's bill for maintenance, achieved by more efficient methods and a better use of facilities, would result in a saving of \$21,000,000 to the electric railways. Such a saving would well repay any effort the industry might make in arriving at this goal.

With the idea of broadening the scope of the maintenance contest which has been conducted by ELECTRIC RAILWAY JOURNAL since 1927, it was decided to base the company awards in 1931 on data showing the general character, quality and cost of the maintenance work done by the various companies in the industry during the calendar year 1930. The information requested was divided into four groups, these being car maintenance, bus maintenance, track maintenance and overhead line maintenance. From this information, the judges were able to make a comparison of the results accomplished. The award for the year 1930 was made to the Georgia Power Company, Atlanta division. A feature article describing the maintenance methods of that company was published in the November issue.

The 43 companies entered in the contest form a good cross-section of the entire industry for comparative purposes. They are



Synopsis of Data for the Year 1930 of All Companies in Maintenance Contest

Car Maintenance

Number of companies.....	43
Passenger cars owned.....	11,189
Per cent of passenger cars owned by all electric railways.....	14.3
Average age of cars, years.....	14.5
Estimated average age of cars owned by all electric railways, as of January, 1931, years	19.5
Car-miles operated.....	287,082,000
Per cent of car-miles operated by all electric railways.....	12.9
Weighted Average Cost of Car Maintenance, Cents per Car-Mile	3.23†
†Average cost of car maintenance for 201 companies, cents per car-mile.....	3.05‡
Average car-miles per pull-in for 39 companies	
Cars overhauled.....	18,726
Per cent of total number of cars owned.....	46.4

Bus Maintenance

Number of companies operating buses.....	30
Buses owned.....	1,862
Per cent of buses owned by all electric railways	
Average age of buses, years.....	13.8
Estimated average age of buses owned by all electric railways.....	3.7
Bus-miles operated.....	58,595,000
Per cent of bus-miles operated by all electric railways.....	3.9
Weighted Average Cost of Bus Maintenance, Cents per Bus-mile	14.7
†Average cost of bus maintenance for 80 companies, cents per bus-mile.....	5.12‡
	4.47‡

Average bus-miles per pull-in for 25 companies.....	4,554
Buses overhauled.....	831
Per cent of total number of buses owned.....	44.6

Track Maintenance

Number of companies.....	43
Miles of paved track.....	2,933
Miles of open track.....	2,200
Total miles of track.....	5,133
Per cent of total miles of track for all electric railways.....	11.8
Miles of track completely reconstructed.....	111.61
Per cent of total miles of track.....	0.26
Miles of paved track reconditioned.....	216
Miles of open track reconditioned.....	142
Miles of new rail laid.....	74.57
New ties laid in open track.....	
Weighted Average Cost of Track Maintenance, Cents per Car-mile	296,088
	1.99‡

Overhead Line Maintenance

Number of companies.....	43
Miles of trolley wire.....	5,133
Miles of trolley wire renewed.....	281
Per cent of total miles of trolley wire.....	5.47
Average trolley wire breaks per 1,000 car-miles	
Average trolley wire breaks per 1,000 kw.-hr.	0.0921
Weighted Average Cost of Line Maintenance, Cents per Car Mile	0.0386
	0.45‡

†Statistics compiled by the American Electric Railway Association.

‡Does not include depreciation.

located all over the United States with several in Canada and one in Cuba. Their operations constitute 13 per cent of the car-miles and 15 per cent of the bus-miles operated by the entire electric railway industry during 1930. Of the 43 companies, 30 operate buses.

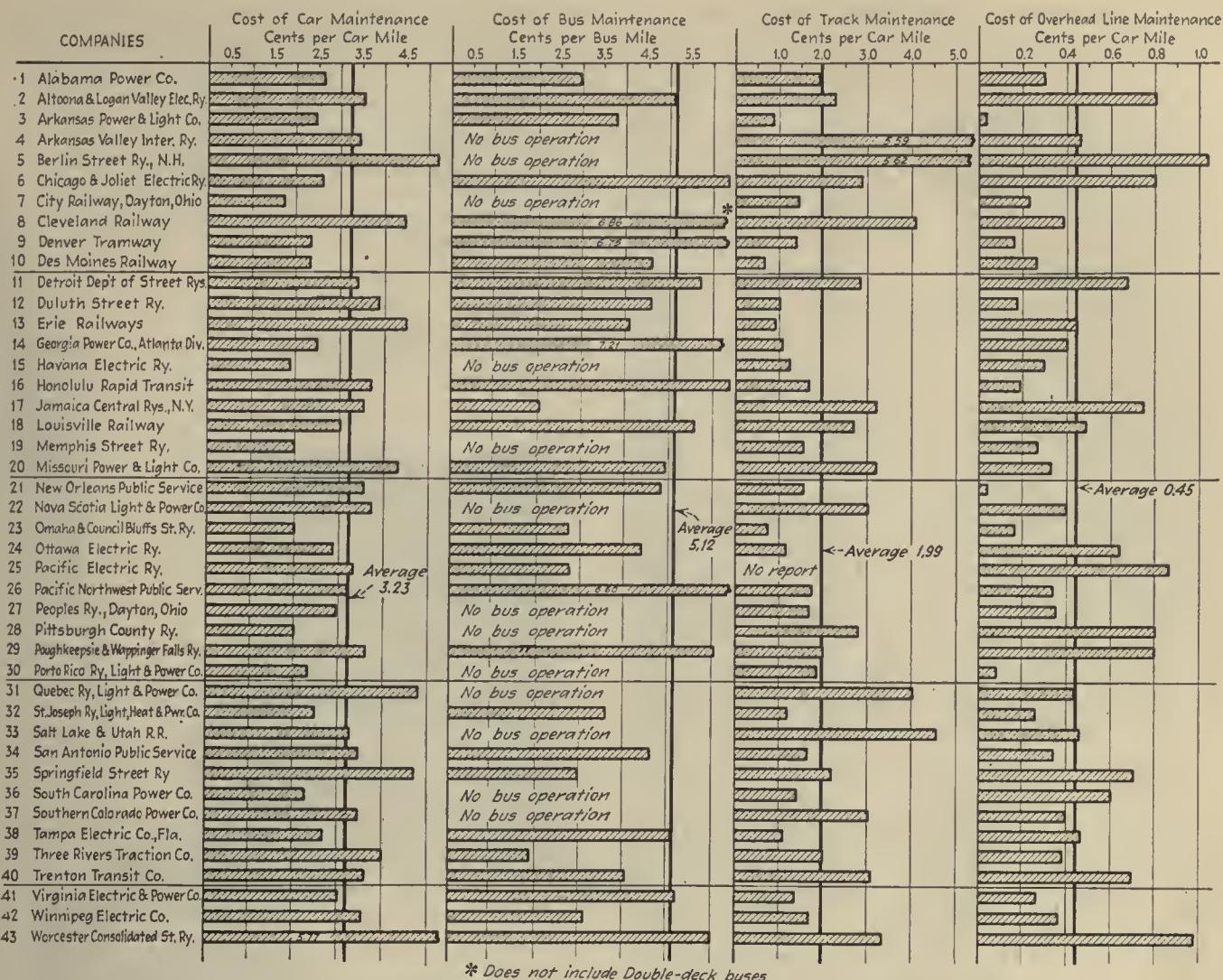
The information requested by the judges included the following: For car maintenance—cost of car maintenance per car-mile, total car-miles operated, average car-miles per pull-in, per cent of total active cars overhauled, bases of inspection, of overhaul, of painting, and of general cleaning, and average age of cars in service; for track—cost of track maintenance per car-mile, total mileage of open track, percentage of open track reconditioned during the year, total mileage of paved track, percentage of paved track reconditioned, mileage of track completely reconstructed, mileage of new rails laid, and number of new ties installed in open track; for overhead lines—cost of overhead line maintenance per car-mile, trolley wire breaks per 1,000 car-miles, trolley wire breaks per 1,000 kw.-hr. of energy consumed, and per cent of trolley wire renewed during the year. Information was requested for bus maintenance along the same lines as was requested for car maintenance. Most of this information, compiled for all the companies as a group, is shown in the table above with pertinent figures for the industry as a whole.

Included in the cost of car maintenance per car-mile were the accounts Nos. 29, 30, 31, 32, 33, 36, 37, 38, 39, 70 and 71. Depreciation was not included in either the cost of car maintenance or of bus maintenance. The

weighted average cost of car maintenance in cents per car-mile for the 43 companies is 3.23. The figure for bus maintenance for 30 companies is 5.12. These costs are shown in the chart by companies.

The pull-in records for each company are shown in the last table. For the purpose of this contest a pull-in was described as any vehicle which was removed from service prior to the completion of its regular run, for any mechanical, electrical or man-failure or accident. If pull-ins were recorded on a different basis an explanation was requested. The relation between the car-miles per car pull-in and the bus-miles per bus pull-in is of interest. The ratio is about 4:1. In other words, for every mile a bus operated without interruption to service, the electric car operated 4 miles.

The figure on average age of passenger cars, shown in the first table, is also interesting. The average age of passenger cars operated by the companies in the contest is five years less than the average age of passenger cars owned by all electric railways, as in January, 1931. The latter figure was obtained from the best information available. A nation-wide survey on the age of passenger cars owned by all electric railways was published in *ELECTRIC RAILWAY JOURNAL* of Jan. 2, 1926. This information was brought up to date by statistics of new cars purchased and cars junked by the electric railways since that time. Likewise, the figure for the average age of buses was obtained from annual statistics of new buses purchased and buses junked. Here the difference between the average age for the industry and the aver-



* Does not include Double-deck buses

Maintenance costs shown for all companies in the contest. Average costs represent weighted averages

age age for the companies in the contest is only 0.2 year. In compiling the information on the basis of inspection for cars and buses, it was revealed that very little uniformity existed in the practices of the electric railways in this work. There appears to be equal non-uniformity in the bases for car maintenance and bus maintenance. Answers to these questions are given briefly. Car maintenance will be taken first. Inspection of cars was done by twenty companies on the basis of elapsed time, of mileage by eighteen companies and of energy consumed by one company. In the first group nine companies reported inspections every seven days, three companies daily, three companies every three days, and two companies every eight days.

In the second group fourteen companies reported inspections every 1,000 miles.

The basis of car overhaul was reported by twenty companies as miles operated, and by twelve companies as elapsed time. In the first group twelve companies overhauled cars between 50,000-75,000 miles, three companies at 80,000 miles and two companies at 40,000 miles. In the second group four companies overhauled their cars every 24 months, and two companies between 18 and 24 months. The variations in this group range from 6 to 36 months. The variations in the mileage group range from 40,000 to 120,000 miles.

Car painting was done on a basis of elapsed time by 28

companies, and on a basis of miles operated by four companies. Five companies report no definite period for painting. In the group of elapsed time, twenty companies painted cars in periods of 18 to 24 months. Three companies reported painting every 30 months. The variation in this group ranged from seven months to three years. The variation in the mileage basis of painting ranged from 40,000 miles to 90,000 miles.

Car cleaning was done on the basis of elapsed time by 22 companies and on a basis of mileage operated by five companies. In the first group six companies cleaned cars every day, five companies every seven days, and three companies every three days. The variations ranged from 1 to 30 days. The variations in the second group ranged from 1,000 miles to 5,000 miles.

Buses were inspected on the basis of miles operated by seventeen companies, and on the basis of elapsed time by seven companies. In the first group nine companies inspected buses every 1,000 miles, and five companies every 2,000 miles. Variations ranged from 750 miles to 10,000 miles. In the second group three companies inspected buses daily and three companies weekly.

Pull-in Records and Trolley Wire Breaks

Company	Average Car-Miles per Pull-in	Average Bus-Miles per Pull-in	Trolley Wire Breaks per 1,000 Car-Miles
1. Alabama Power Company.....	17,100	0	No report
2. Altoona & Logan Valley Electric Ry....	4,708	2,844	0.01600
3. Arkansas Power & Light Co.....	18,020	4,718	0.00454
4. Arkansas Valley Interurban Railway.....	No report	.....	0.00360
5. Berlin Street Railway, Berlin, N. H.....	No report	.....	0
6. Chicago & Joliet Electric Railway.....	2,700	1,200	0.00800
7. City Railway, Dayton, Ohio.....	4,576	2,630 ^b	0.01700
8. Cleveland Railway.....	2,225	.....	0.00082
9. Denver Tramway.....	6,146	1,363	0.00254
10. Des Moines Railway.....	6,270	3,340	0.00390
11. Detroit Dept. of Street Railways.....	11,710	49,408	0.00242
12. Duluth Street Railway.....	2,348	No report	No report
13. Erie Railways.....	6,500	4,000	0.00001
14. Georgia Power Company, Atlanta Div.....	142,678	2,883	0.00099
15. Havana Electric Railway.....	6,206	.....	0.01254
16. Honolulu Rapid Transit Co.....	27,878 ^a	3,380	0.00130
17. Jamaica Central Railways, N. Y.....	1,309	5,195	0.00694
18. Louisville Railway.....	6,085	2,570	0.00496
19. Memphis Street Railway.....	27,923	.....	0.00246
20. Missouri Power & Light Co.....	No report	No report	0.01000
21. New Orleans Public Service.....	162,905	No report	0.00083
22. Nova Scotia Light & Power Co.....	2,014	.....	0.00150
23. Omaha & Council Bluffs Street Ry.....	2,329	1,977	0.01800
24. Ottawa Electric Railway.....	2,145	2,264	0.00224
25. Pacific Electric Railway.....	24,652 ^a	6,741	0.00345
26. Pacific Northwest Public Service Co.....	4,838	1,454	1.61000
27. People's Railway, Dayton, Ohio.....	6,221	.....	0.00001
28. Pittsburgh County Railway.....	15,300	.....	0.04680
29. Poughkeepsie & Wappingers Falls Ry.....	No report	No report	No report
30. Porto Rico Railway, Light & Power Co.....	19,567	.....	0.00161
31. Quebec Railway, Light & Power Co.....	1,566	.....	0.00800
32. St. Joseph Ry., Light, Heat & Power Co.....	7,260	1,473	0.02740
33. Salt Lake & Utah Railroad.....	100,464 ^a	.....	0.00055
34. San Antonio Public Service Co.....	8,099	2,392	0.00023
35. Springfield Street Railway.....	1,800	2,400	1.20000
36. South Carolina Power Company.....	12,000	.....	0.00670
37. Southern Colorado Power Company.....	16,631	.....	0.01500
38. Tampa Electric Company.....	4,497	2,177	0.02050
39. Three Rivers Traction Company.....	13,143	1,988	0.6000
40. Trenton Transit Company.....	6,096	2,628	0.01010
41. Virginia Electric & Power Company.....	19,898	2,468	0.00060
42. Winnipeg Electric Company.....	2,730	970	0.00392
43. Worcester Consolidated Street Ry.....	1,855	1,397	0.00800
Average.....	18,726	4,554	0.0921

^a Pull-ins due to mechanical failures.
^b Single-deck buses only included.

In the second group the variations ranged from 6 to 24 months. Bus painting on the basis of elapsed time was done by fourteen companies, and on the basis of miles operated by three companies. In the first group six companies paint buses every 24 months and four companies every twelve months. The variations ranged from 12 to 36 months. The three companies painting buses on the basis of mileage did so between 750,000 and 100,000 miles.

Cleaning of buses was done on elapsed time by 21 companies, and only by three companies on the basis of miles operated. In the first group ten companies cleaned buses daily, four weekly and four monthly. The mileage basis for the other three companies is 1,000 miles.

Tail Light Warns of Defective Line Switch*

By R. W. JAMES
Electrician
Ottawa Electric Railway

PROMPT indication of frozen contact tips of automatic line switches is had on cars of the Ottawa Electric Railway by wiring the green tail light so that it will burn when two of the contacts are frozen. As all our new cars are equipped with a red and a green tail lights for traffic purposes, this was accomplished by a simple change in the connection of the tail light circuit. Formerly, to determine whether any of the contact tips were frozen, it was necessary to examine the switch, or to notch up the controller with the control switch off. Occasionally repair men would be badly burned when working on a controller without knowing of the defective switch.

The connection of the tail light circuit was changed

from the R-1 terminal in the controller to the trolley terminal, without interfering with the original purpose of the lights. With this connection, current will flow to the green tail light when there are two line switch contacts frozen. If a car is standing still on the street or in the carbarns with both the green and red light burning at the same time it is an indication that the main line switch is defective. When this occurs repairs are made as soon as possible. All inspectors are instructed to notify the repair department when they see both tail lights burning on a car.

Bumper Straightener*

By W. R. MCRAE

Superintendent of Rolling Stock and Shops
Toronto Transportation Commission



Appearance of cars is improved when bumpers are kept in shape with the straightener

USE of a bumper straightener has much to do with the well-kept appearance of the cars of the Toronto Transportation Commission. It is somewhat similar to the ordinary manual rail bender, except that the force is exerted in a reverse direction. The device consists of a heavy horseshoe-shaped steel casting that rests on suitable pads placed against the anticlimber. From the center extends a heavy steel hook that is placed behind the bumper, and force is exerted by the revolving of the ratchet-operated nut that is mounted on the square threaded end of the hook. The whole is mounted on a four-wheel truck, and by turning a screw it can be elevated so as to be used for different heights of car bumpers. One of these handy tools is at each carhouse and one in the shops.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

High-Speed Motors Require Special Maintenance Practice

By J. K. STOTZ

Railway Motor Engineer
Westinghouse Electric & Manufacturing Company

RECENT motors for use on trolley buses, W-N drive cars, gas-electric buses, and similar vehicles, differ in several respects from street car motors of standard type. All are spring suspended, run at comparatively high speeds, and have ball or roller bearings. These characteristics introduce several maintenance problems not met in the older moderate-speed motors.

Lubrication of the ball or roller bearings differs considerably from that of sleeve bearings. All of them are grease lubricated, and the consistency of the grease must be correct for the particular bearing inclosure. It must be clean, free from acid and have no tendency to separate at operating temperature. The quantity to be used and the interval between greasings are recommended by the manufacturer, but may be modified for individual needs.

Usually there is more danger in overgreasing than in undergreasing. Excess grease is churned up between balls or rollers in the bearings, with overheating and separation of the grease and some danger of bearing failure. Also, the excess grease is forced out of the bearing through the labyrinth seals or grease overflow, and enough may get inside the motor to damage windings or insulation. Where felt seals are used, the grease pressure may become sufficient to damage the felts.

It cannot be emphasized too strongly that dirt must be kept out of anti-friction bearings. While its presence in sleeve bearings shortens their life to some extent, the oil passes through the bearing to the outside and carries away much of the dirt which may enter the bearing. Dirt that becomes embedded in the babbitt does little or no further damage. But in anti-friction bearings the dirt that enters remains and causes rapid wear. Dirt and grease of poor or unsuitable quality are the things that cause short bearing life. Eliminating these the bearing performance should be satisfactory.

Commutators on high-speed motors, while essentially similar to those of axle-hung motors, have a higher peripheral speed, making it more important that the commutator surface be smooth. Turning and undercutting of the mica must be done even more carefully than on axle-hung motors. Clearance to ground and distance between brush holders is less than on the large motors, making it more important that the V rings be kept free of carbon dust and grease.

High-speed motors tend to have greater friction losses at light loads than the axle-hung motors. To reduce these, it is advisable to use brushes with a low friction co-efficient, and to adjust the brush holders for low spring pressures. This is possible on account of the spring suspension of the motors. With the low spring pressures, somewhat more careful inspection is necessary

to insure that the brushes are free in the holders, since little excess pressure is available to overcome friction caused by dirt. Inspection, especially on bottom brush holders, should include removal of dirt particles between the finger and the carbon. Such dirt particles have been known to open this path so that all the current must flow between the carbon and the side of the box with severe burning of the box. This can be avoided by the use of brush shunts where dust is very bad.

A motor with anti-friction bearings must have adequate seals against entrance of dirt and for the retention of grease. This makes the mechanical assembly of the armature in the frame quite complicated. Removal of the armature and particularly of the bearings is difficult unless adequate tools are available. Proper pullers or design drawings of them, as well as section drawings of the motors showing the assembly, can be obtained from the manufacturers. No attempt should be made to dismantle a motor without such tools and drawings. With proper equipment and knowledge of the manner in which the parts go together these motors can be handled with little difficulty.

Being relatively small these motors require somewhat more care in handling than the axle-hung motors. Bolts are necessarily small and may be stretched or even broken if they are not handled with reasonable care. In assembling parts with press fits it is usually advisable to shrink them on, preferably heating them in oil. Every precaution should be taken to protect the anti-friction bearings from dirt, water and rust while they are exposed. In the factory of one manufacturer, anti-friction bearings which are not assembled in a motor within two hours after unwrapping are either scrapped or returned for cleaning. This standard of cleanliness is necessary to obtain perfect performance of anti-friction bearings.

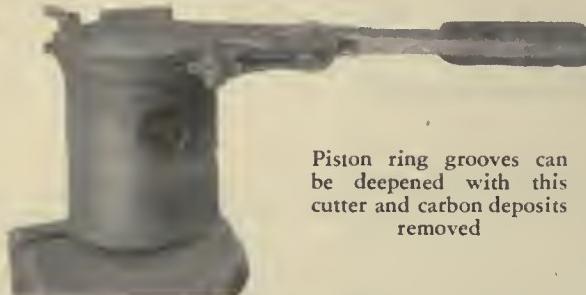
No special precautions need to be taken in rewinding high-speed armatures except that balance is essential to avoid vibration at the high operating speeds. The armature is balanced dynamically at the factory before winding. Slight unbalance due to the winding is corrected by a second dynamic balancing, the correcting weights being placed on the band wires. When the armature is rewound it will be in dynamic balance except for irregularities in the winding. If the winding is done carefully this unbalance is so small that it may be neglected.

Band stresses in these motors are fairly high, so that when rebanding the same size wire and the same tension as those used originally should be employed. A temporary band should be put on after preheating the armature and the permanent bands placed after the armature is cold and pulled down solidly on the coil supports.

Cutting Tool for Compressor Pistons*

By A. J. LEE
Master Mechanic
Toronto Transportation Commission

FOR deepening or slightly widening the piston ring grooves on air compressor pistons, the hand tool illustrated here has been designed in the shops of the Toronto



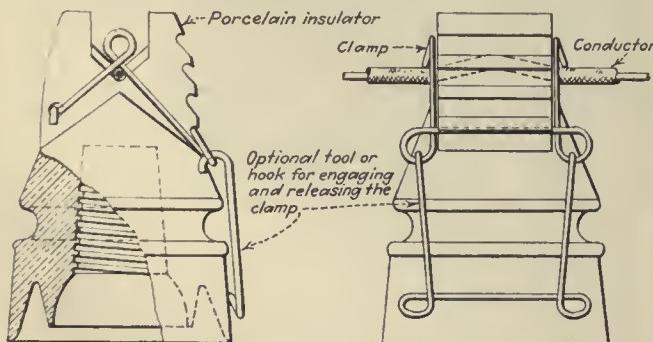
Piston ring grooves can be deepened with this cutter and carbon deposits removed

Transportation Commission. The need for this tool came about when a change was made from rings made by the compressor manufacturer to another type. These were found to be slightly thicker, and when in place did not close up sufficiently to allow the pistons to enter the cylinder. This cutting tool deepens the groove sufficiently to give the required clearance, without the necessity of putting the piston in a lathe. Grooves sometimes become worn sideways, necessitating an oversize ring. This tool has been found useful in standardizing groove width and cleaning out any carbon deposit.

Pin Insulator with Clamping Device*

By H. G. ENGELHARDT
Distribution Engineering Department
New Orleans Public Service, Inc.

DIFFERING from the standard porcelain pin insulator only in the shape of the head and in the method of tying in the conductor, a new insulator was recently adopted by New Orleans Public Service, Inc. Instead of having the usual saddle top and side grooves, it has two vertical projections between which is the groove for the conductor. Through the base of one of these projections is a hole for pivoting a spring clamp which holds the conductor. The outside surface of the other projection is notched to engage the free end of the spring clamp. The particular notch to be used depends on the diameter of the line conductor. Any tendency of



Ease of renewal is one of the advantages of the pin insulator used by New Orleans Public Service, Inc.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

the conductor to pull out of the insulator engages the clamp tighter in the holding notches.

The clamp itself is made in one piece of non-corrosive spring bronze. It is attached to the insulator by inserting the pivot end through the hole at the base of one of the projections, and clinching through an eye on the other side. There is practically no labor required in clamping the conductor in place. This is done by merely placing it in the groove and swinging the clamp over and across it, and pulling the free end down to engage the proper notch. No separate tie wires are necessary.

This design also facilitates the removal of defective insulator on a live high-voltage line where "hot sticks" are necessary. Untying and tying the conductors to the insulator with the usual tie wires is always cumbersome and difficult under these conditions. The spring action of the clamp also maintains a tight contact in the insulator at all times, thus eliminating to a great extent the capacity effect between the conductor, tie wire and insulator.

Stand for Axle Repairs



Hoisting axle to stand

REPAIRS to axles of motor buses of the Worcester Consolidated Street Railway are facilitated by the use of a handy stand. The height of the stand permits the mechanic to make the repairs in a comfortable position, and makes every part of the axle easily accessible. The axle is clamped with two L-shape pieces with narrow edges that are made to fit underneath the flanges of the axle. The two pieces are bolted to hold the axle securely and are hoisted to the stand, as shown. The stand has a flat plate with two upright bolts which fit into the holes of the clamping pieces for fastening them to the stand. With this device, a minimum of manual handling is necessary. The axle is picked up from the ground and carried by the hoist to the stand.



Axle mounted on stand and ready for repair

Special Wrenches for Electric Couplers*

BY FRANK AYERHART
Repairman
Toronto Transportation Commission

DIFFICULTY was experienced in handling the original style of terminal and contact tips, fitted to the Tomlinson electric coupler block, with gas pliers, screwdriver or many ordinary tools of the repairman. Two T-shaped wrenches were found suitable for these connections. One wrench fits the flats on the contact tip, and the other has the form of a hollow screwdriver, which on the outside engages with the slots in the stud nut. The center is cut back so as to allow the end of the stud to enter far enough when tightening the slotted stud nut. These two handy tools facilitate repairs and prevent damage to the coupler parts by use of unsuitable tools.



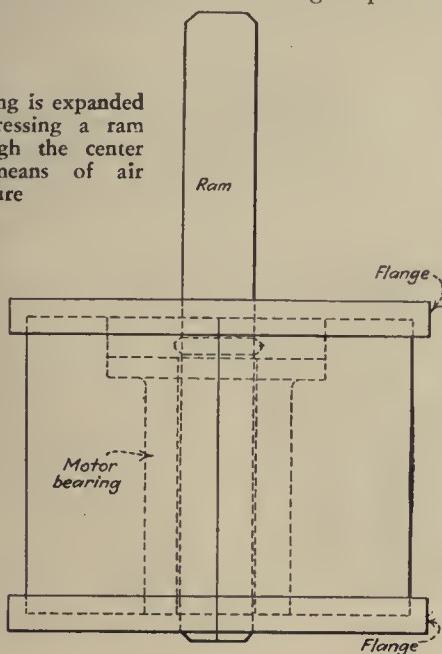
Tee wrenches have been developed in Toronto to facilitate repairs to Tomlinson electric couplers

Expanding Undersize Sleeve Bearings

BY MICHAEL AXLER
Interborough Rapid Transit Company

RECLAMATION of undersize motor bearings of the sleeve type is accomplished on the Interborough Rapid Transit Company by the method shown in the illustration. The undersize bearing is placed in a split

A bearing is expanded by pressing a ram through the center by means of air pressure



sleeve with an internal diameter equal to the desirable external diameter of the bearings. Upper and lower flanges are made to fit snugly over the sleeves, and have a hole to allow for the travel of a circular ram as shown. After the undersize bearing has been babbittted, it is placed in the jig and the ram is pressed through the center by means of air pressure. The circular disk of larger diameter at the middle of the ram compresses the babbitt of the bearing, and expands the bearing to have an external diameter equal to the internal diameter of the sleeve. A different jig is required for each size of bearing.

Relining Brakes for Greater Bus Mileage

By C. B. LINDSEY
Superintendent of Automotive Equipment
Los Angeles Railway



This brake block trimming machine of the Los Angeles Railway eliminates the customary "burning in"

INCREASE in mileage has been obtained from brake drums and linings of buses operated by the Los Angeles Railway by a method of relining brakes used in the shops. This method produces a brake that can be used without the need of "burning in," and will give many miles of service without the need of adjustments.

Brake castings made to our specifications and design are used. Homogeneous nickel cast iron or gun metal has been found most satisfactory, and is easily machined. To reduce distortion and noise vibration, several ribs on the outside and the heavy flange are incorporated in our design. Provision is made for adequate ventilation. When received from the foundries, the castings are rough machined in a heavy lathe, then drilled and mounted on the hub, and finally finished to standard size on a brake drum lathe.

In relining the brakes of a bus, the wheels are removed and brake drums trued up on the lathe. They are then calibrated, and, if needed, new oversize brake blocks are fitted to the shoe heads. If the drums are greatly enlarged heavier cam points are fitted. These are kept in store in several thicknesses. Hinge pins and bushings are checked and replaced if necessary, and the cam is returned to its lowest point. The brake lining is then resurfaced to the correct radius by use of a brake trimming machine.

The brake trimming machine was designed and built in our machine shop. It consists of an old hub to which

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

has been attached a bracket or tool post, movable to various diameters. The tool holder is also adjustable to accommodate the different brake spiders. The cross feed is driven by a star wheel which can be turned by hand, or fed automatically by clamping a small piece of stock to the fender. When trimming rear brakes, the bus engine is used to turn the machine; when working on buses with full-floating axle shafts, the axle shaft is used as a driver. Adapters have been made to fit the various types of full and semi-floating axles with which our buses are equipped. Only a small amount of material is removed, and a single cutter similar to a lathe tool has been found satisfactory.

The present molded linings and brake blocks are designed for hard wear and long life, and if the correct radius is not obtained when the brakes are relined it will take hundreds of miles of service before there is full contact between the lining and the drum. This condition frequently makes it necessary to raise the air pressure to a point where scored or warped drums result from the increased speed. All this is eliminated by obtaining the correct radius with the device described.

Cradle for Removal of Wheels and Axles from Cars*

By W. DILLON AND T. G. CULHAM
Toronto Transportation Commission



Hydraulic jack used by the Toronto Transportation Commission to remove wheels with safety

REMOVAL of wheels and axles from the cars of the Toronto Transportation Commission is now accomplished by means of a hydraulic jack that is movable in the pit. The previous method of removing the wheels involved the use of two sets of blocks. A block that was deep enough to get up under the axle between the bearing housings was placed on top of the hydraulic jack, and the wheels lowered until the journal boxes rested on the rail, which had been pulled back sufficiently to clear the wheels. The first block was then replaced by two more stable and lower blocks which gave the axle a safer seat.

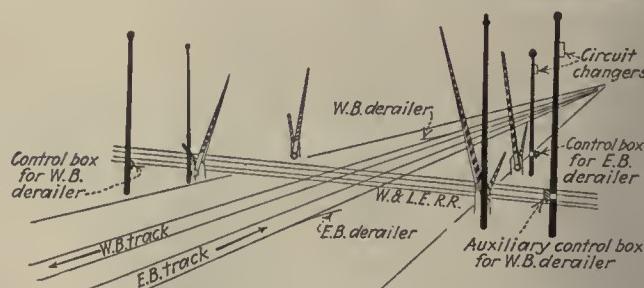
By using the illustrated cradle, the work of changing wheels was much simplified. The wheels can be dropped in one operation, and the work is done more safely.

The cradle is made of wood, having a vee block at one end to take the axle, and a rest at the other end on which the gear sits. Separate cradles are used for axles of different types of motors, owing to gear and wheel variation.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Electrically Controlled Derailer*

BY E. B. SPENZER
Special Work Engineer
Cleveland Railway



Each derailer has its control box on opposite side of crossing

PRIOR to this year, all derailers at railroad crossings of the Cleveland Railway were of the mechanical, hand-operated type. These derailers required considerable maintenance and, during the winter, it was necessary frequently to block the points because of frozen channel boxes and pullrods. For the purpose of improving these conditions, two electrically operated derailers have been developed and installed at a crossing.

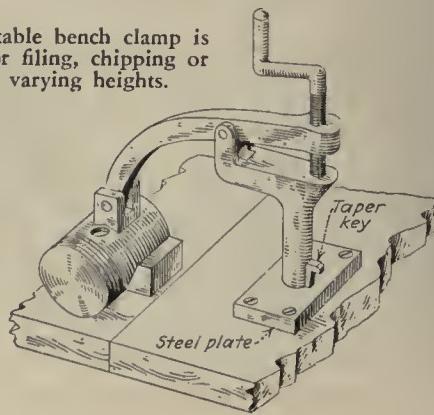
Each derailer is a standard 100-ft. radius switch connected to an electric switching device at the curb on the far side of the railroad tracks. To manipulate it, the operator pulls the handle of the control box toward him. This breaks the circuit and closes the switch point, which opens when the handle is released. The auxiliary control box, which is placed on the same side of the crossing is designed to be used during the morning and evening rush periods by an operator stationed at the curb.

The cost of installing these electrical derailers compares quite favorably with the older types, while the maintenance charges are confined to regular inspection. The performance has been so satisfactory that it has been decided to replace the old type with the newer models whenever a renewal is necessary.

Adjustable Bench Clamp

HANDY for filing, chipping or fitting pistons or other similar parts at varying heights is the device illustrated. Like all simple devices it will be found helpful in many shop operations. It can be fastened to a work bench through a steel plate by means of a taper key or wedge. The clamping height can be varied by turning the threaded handle. The maximum height can be increased by increasing the threaded portion of the handle.

This adjustable bench clamp is handy for filing, chipping or fitting at varying heights.



NEW PRODUCTS for the Railways' Use



Latest 40-passenger trolley bus developed by J. G. Brill

Forty-Passenger Trolley Bus

PROPER load distribution, simplified control, easy steering and light weight with speed and safety, were considered the outstanding features to be obtained when the J. G. Brill Company began the development of its 40-passenger trolley bus.

The seating arrangement of this vehicle consists of ten cross-seats with individual backs, located in the center portion of the body, and three longitudinal seats over the wheel-housing. A 2-passenger cross-seat is opposite the treadle exit door and a 5-passenger longitudinal seat sets against the rear dash.

Twelve double-coil heaters are the source of heat for the interior. One extra-capacity cab-type heater, controlled from a separate snap switch is placed in the front vestibule.

Two 50-hp. motors drive the vehicle through double worm gearing housed in the double-bowl rear axle. Each motor drives one wheel through its own propeller shaft and gearing. Two driving units, a recent design of hour glass worm and worm wheel

Weights and General Dimensions

Weight of complete bus	18,260 lb.
Weight on rear wheels	10,956 lb.
Weight on front wheels	7,304 lb.
Length over bumpers.....	31 ft. 6 1/2 in.
Height from ground to step, front.....	15 in.
Height from ground to step, rear.....	16 in.
Over all width of body not to exceed.....	.96 in.
Aisles width .....	.208 in.
Seat length .....	.34 in.
Seat centers .....	.283 in.
Post spacing .....	.378 in.
Turning radius .....	.35 ft.
Wheelbase .....	.192 in.
Tread, front .....	.813 in.
Tread, rear .....	.74 in.
Front overhang .....	.82 in.
Rear overhang .....	.89 in.
Minimum road clearance under rear axle housing .....	.10 1/4 in.
Cruising radius, each side of wire.....	9 ft.

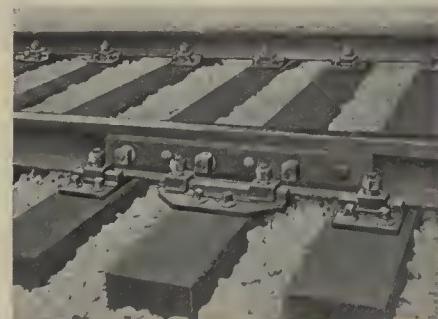
type, are mounted on tapered roller bearings in oil-sealed housings. The propeller shafts are connected to the motor and driven through two oil-sealed universal couplings per shaft.

The control apparatus is placed under the floor of the vehicle. It is pedal operated, selective, automatic accelerating, remote type, and is wired in circuits with the motors. The motors are connected in parallel, and are placed between the two longitudinal center sills. The controller and reverser box is in front of the motors.

Four-wheel automotive internal-expanding drum-type brakes are operated by standard railway air-brake equipment, actuated by a foot pedal. The body is spring mounted on Timken axles developed especially for trolley buses.

Rail Fastenings Simplify Renewals

RAIL renewals can be made without disturbing the ties or ballast in the GEO type of track construction introduced in this country by the



One-tie supported joint plate in track

Carnegie Steel Company. The fundamental differences between the GEO type of track construction and the construction generally used in the United States lie in the design of the plate, method of fastening the tie plates to the tie, method of fastening the rails to the tie plates and the use of a treated and compressed wood shim with each plate.

The intermediate tie plate assembly consists of a double-shouldered rolled-steel plate, two 3-in. U-shaped rolled-steel clamps with bolts, two spring washers, one wood shim and the four screw spikes, which hold the plate to the tie, independent of the rail fastenings. Slots are milled in each shoulder of the plate, and the clamp bolts are made with heads of the same contour as the slot in the shoulders. The joint plates are of the same section and can be made for either the suspended or supported type of joint.



Assembled intermediate plate

Compressed wood shims are placed between the rail and tie plate. These shims are made from poplar, compressed and creosoted. They are of the same width as the base of the rail, and in length overlap the edge of the tie plates $\frac{3}{4}$ in. on each side.

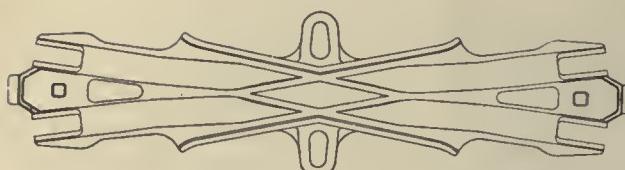
The two-tie suspended plate is approximately 27 in. long, and the one-tie supported plate is approximately 16 in. long. Both have four rail clamps.

This type of track construction was developed in Germany primarily for steam railroad tracks but it has been found satisfactory in interurban track construction. About 8,000 miles of this type of track has been constructed in Germany. Claims made for the GEO track are longer life of ties by minimizing mechanical wear, longer life of rail, less wave motion, elimination of rail creeping, absolute maintenance of gage, and a better joint construction.

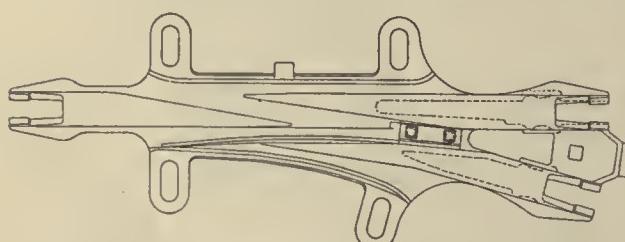
Trolley Bus Line Material



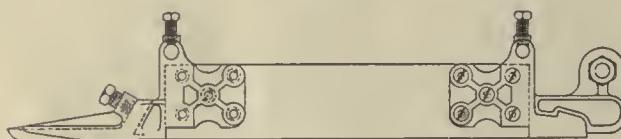
Ball and socket hanger



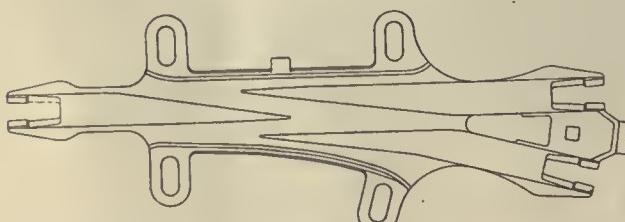
15 deg.-23 deg. angle crossing



Spring frog



Single-beam section insulator



Overlapping runner frog



Adjustable crossing



Swivel polehead

Developed by the
**Westinghouse Electric & Manufacturing
Company**

TANGENT LINE

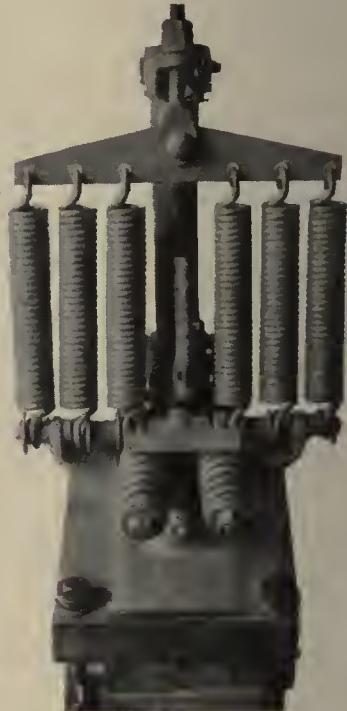
Frequently the trolley ear does not hang vertically because the cross-span tension is limited. This causes a tilting of the trolley car. A ball-and-socket hanger permits the ear to hang vertically.

CONVERGING OF TROLLEY BUS LINES

Where two lines converge into a common line, an acute-angle crossing, two overlapping runner frogs and section insulators are used. At the crossing, a swivel polehead does not insure positive operation for acute angles on standard railway frogs. The double-angle crossing, which has a 15-deg. angle at the throat and a 23-deg. angle at the overlap, is a method of making crossing without using movable parts. It prevents jamming of the collector at the overlap. The overlapping runner frog permits the collector to ride on the tongue instead of on the pan. It is a duplicate of the one used for railway construction. The single-beam section insulator is rigidly attached to the frog.

DIVERGING OF TWO TROLLEY BUS LINES

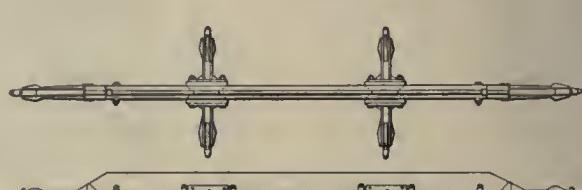
An electrically operated tongue frog is required for positive operation at turnouts. Tongue movements are made by electrical equipment actuated by "power on" and "power off" applications by the bus operator. A mechanical connection is made to a corresponding frog tongue in the adjacent wire.



Trolley bus collector base

WYES

In wye construction, where a bus moves forward and backs for the turn, the direction followed by the swivel polehead is fixed by overlapping runner frogs with a guiding spring that snaps and returns on entering the frog, thereby assuming the correct position for leaving the frog.



Double-insulated crossing

CROSSINGS WITH BOTH LINES INSULATED

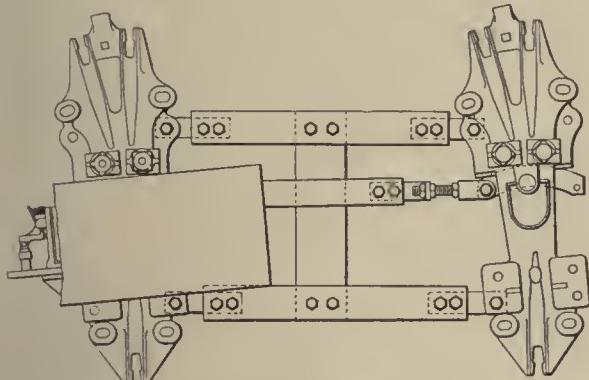
When the negative contact wire is insulated at crossings the trolley buses must coast under these crossings. Rigid or adjustable metallic crossings, duplicates of those used in railway construction, may be used, depending on the crossing angle. Two wires are continued through without a break while the remaining wires are terminated in one end of a single-beam section insulator. The other end of the insulator is rigidly attached to the crossing. The insulator end castings are shaped to prevent arcs from burning holes in the insulation between the bronze-casting clamps. Two crossing connections are made by the contact wires, and two by special adapters.

CROSSINGS WITH ONE LINE INSULATED

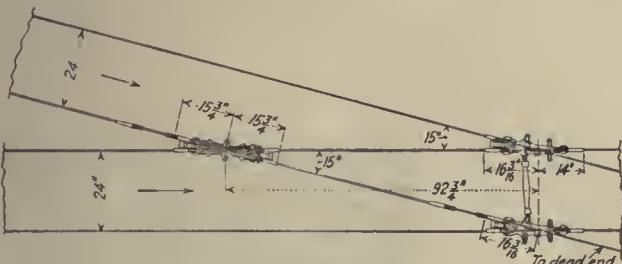
Where a trolley bus line crosses another against grade, one line should have power and the other should coast across. Two double-insulated crossings connected together by adapters make this possible without cutting the contact wires. The crossings are adjustable for angular movement.

CURRENT COLLECTORS

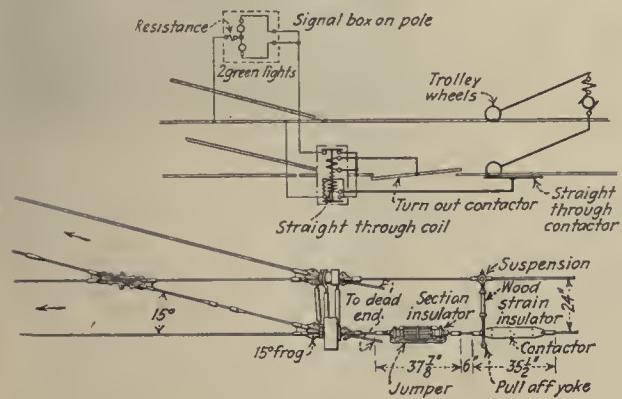
Trolley bus collectors require 18-ft. poles to permit side range and a polehead that will swivel sufficiently to maintain alignment of the collector contacts with the wires. Both pole and poleheads are heavier than those for electric cars, and require a base with a greater spring tension. The base has six springs instead of four as used on cars.



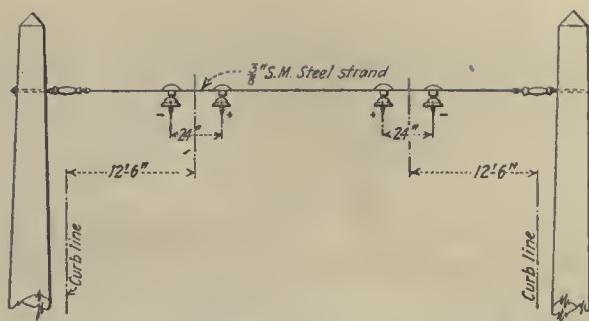
Electrically operated frog



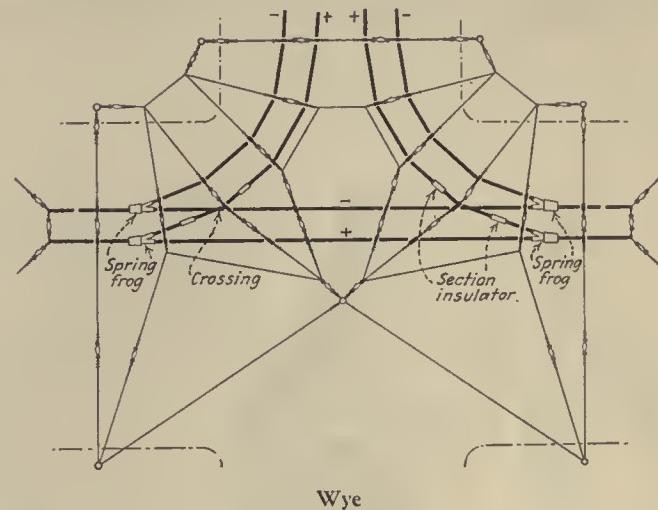
Converging lines



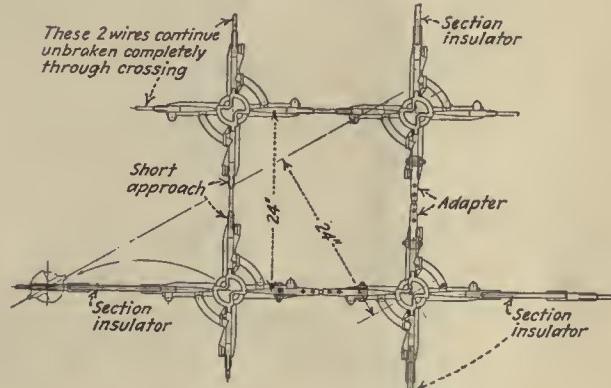
Diverging lines



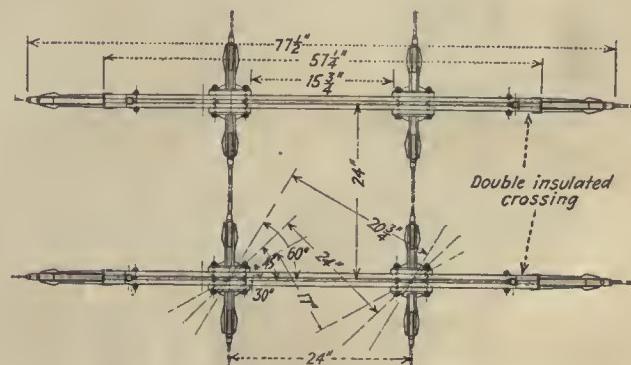
Tangent cross-span



Wye



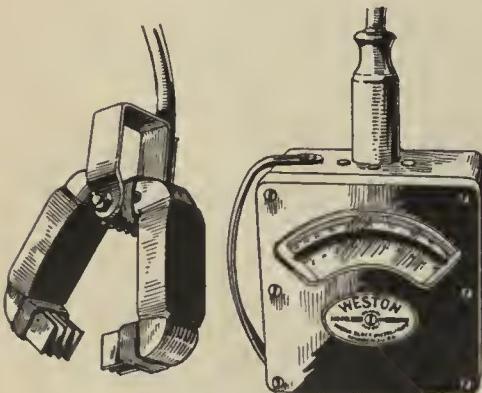
Crossing with both lines insulated



Crossing with one line insulated for 60 deg.-90 deg. angle



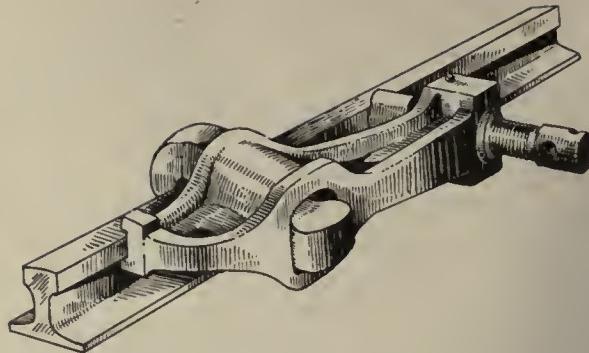
Bolt Tightener which has a special adjustable spring-tension over-running clutch to insure uniform tightness and tension on all rail clips. Only one man is needed to handle this device. *Manufacturer:* International Steel Tie Company, Cleveland, Ohio.



Load Testing Set designed to measure current anywhere without interruption to service. The equipment consists of a split-core current transformer and a Weston ammeter, complete with connecting cable and plugging device. The transformer can be clamped over any type of conductor, bus bar, or terminal. The device has an accuracy of 1 per cent of full scale on the higher ranges. *Manufacturer:* Electrical Engineering Sales Company, Los Angeles, Cal.



This Feeder Wire Insulator has a 3½-in. petticoat of Dirigo insulating compound, extending below the metal parts. Into this Dirigo is molded a 1-in. pin-hole to fit standard wood pins. The saddle on which the cable bears is curved to conform with the droop of the wire to avoid damage to heavy cables. The 1½-in. seat accommodates standard 500,000-circ. mil weatherproof cable. *Manufacturer:* Ohio Brass Company, Mansfield, Ohio.



Reversible Rail Bender used for right-hand or left-hand by merely reversing the hook. It is not necessary to add angle bar and extra piece of rail. The bending screw is mounted in a trunnion bushing which swivels as the rail bends, exerting a pressure normal to the point of contact. *Manufacturer:* American Chain Company, Bridgeport, Connecticut.

Adjustable Seat for Bus Operators

Heywood - Wakefield Company, Boston, Mass., is marketing a seat for bus operators that permits adjustment of height. This seat has a cushion that can be moved forward and backward, and the back can be inclined to the desired angle.

Cal-O-Rex

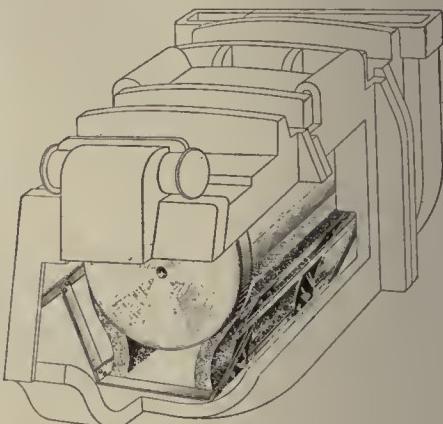
Liquid for the removal of rust and scale in hot-water heating systems is being sold by the Economy Electric Devices Company, Chicago, Ill., under the name of "Cal-O-Rex." It is mixed with the circulating water to dissolve the scale. Its freezing point is —35 deg. F. and the boiling point 230 deg. F.

Mastipave

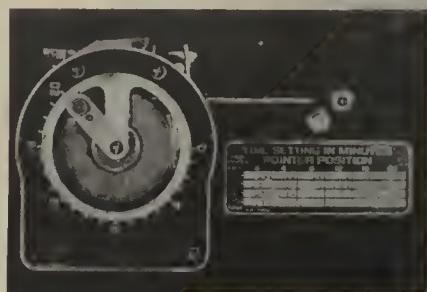
Mastipave is a floor covering material for cars and buses being introduced by the Paraffine Companies, Inc. It is a fiberized mastic with a felt core and is laid in strips by cold-cementing to the floor surface. It is claimed to be waterproof and slip-proof, and easily cleaned by mopping with soap and water.

High Friction Brake Lining

Johns-Manville Corporation is producing a folded and compressed type of brake lining for heavy buses equipped with mechanical brakes. Modifications in the material itself and the methods of manufacture were made to produce frictional characteristics that would permit a uniform retardation rate with brakes designed for a high friction type of lining. Other advantages claimed are exceptionally long life and lack of any tendency to cut the brake drum.



Journal Box Lubricator which can be quickly installed and removed, and saves time in inspection by the elimination of waste packing. Running temperatures of the journal is said to be greatly decreased because of the larger radiating surface and more efficient lubrication. *Manufacturer:* C. B. Royal & Company, 426 South Clinton Street, Chicago, Ill.



This Headway Limit Signal informs the dispatcher when headway on a line exceeds a predetermined limit. It is used with an installation of overhead trolley contactors, the impulses from which are relayed over telephone wires to a central point. The above signal contains two rows of ten timers in each row controlled by one motor, and represents a control of ten lines, with one point on the inbound and another on the outbound track. *Manufacturer:* Nachod & United States Signal Company, Louisville, Ky.

Trend of REVENUES and EXPENSES

	Operating Revenue	Increase or Decrease \$	Operating Expenses and Taxes \$	Increase or Decrease %	Net Income \$	Increase or Decrease %	Operating Revenue	Increase or Decrease \$	Operating Expenses and Taxes \$	Increase or Decrease %	Net Income \$	Increase or Decrease %	
Boston Elevated Railway, Boston, Mass.													
Oct., 1930....	2,811,399	4.04	2,157,474	1.29	221,188	31.30	75,708	17.80	66,353	0.69	18,447	226.80	
Nov.....	2,579,899	10.34	2,066,206	2.58	71,150	77.85	72,024	13.82	66,314	0.83	21,171	152.25	
Dec.....	2,850,330	8.80	2,178,896	2.24	235,950	56.62	Jan., 1931....	79,764	15.78	67,438	7.38	13,133	236.77
Jan., 1931....	2,840,159	8.43	2,082,456	6.83	314,067	30.56	Feb.....	74,018	13.38	62,239	7.93	13,594	75.36
Feb.....	2,534,828	8.33	1,952,032	5.23	142,339	48.27	Mar.....	75,201	7.83	64,051	7.61	13,965	5.28
Mar.....	2,769,564	7.30	2,019,081	4.92	309,212	29.08	Apr.....	70,660	0.48	62,685	4.90	18,298	23.64
Apr.....	2,616,188	7.00	1,909,176	7.93	275,740	11.45	May.....	72,560	8.29	61,048	8.82	15,998	21.34
May.....	2,579,265	8.70	1,993,753	4.36	143,804	52.47	June.....	63,338	13.81	59,346	9.15	24,700	97.48
June.....	2,415,179	5.32	2,073,560	7.04	99,815	169.79	July.....	58,406	4.11	59,429	7.33	20,259	16.34
July.....	2,188,942	7.88	2,021,305	4.12	271,777	62.23	Aug.....	61,749	4.40	57,896	7.34	7,823	46.23
Aug.....	2,098,072	7.99	1,948,492	7.79	344,901	85.50	Sept.....	60,302	18.55	58,616	7.78	23,041	171.16
Sept.....	2,243,491	9.20	1,931,683	7.65	239,950	300.79	Oct.....	.....	.....	.....	.....	.....	.....
Oct.....	2,502,848	10.98	1,926,536	10.70	30,145	86.37	.....	.....	.....	.....	.....	.....
Brooklyn-Manhattan Transit System, New York, N. Y.													
Oct., 1930....	5,036,775	2.58	3,572,553	4.22	758,817	2.78	Oct., 1930....	38,032	11.56	27,266	8.85	.....	.....
Nov.....	4,769,083	4.97	3,366,923	6.98	689,470	2.34	Nov.....	36,974	12.49	44,183	9.58	93,885	127.12
Dec.....	5,065,484	2.56	3,546,963	4.25	814,788	2.04	Dec.....	36,166	15.00	27,949	1.79	99,343	112.93
Jan., 1931....	4,852,706	5.48	3,475,330	7.01	674,029	5.80	Jan., 1931....	33,291	20.15	25,057	9.18	105,000	110.59
Feb.....	4,453,655	3.79	3,159,903	5.96	583,468	2.40	Feb.....	32,281	19.80	22,990	9.84	111,369	110.17
Mar.....	5,028,562	2.58	3,475,847	3.37	814,360	4.13	Mar.....	32,904	22.38	24,732	14.59	114,459	93.49
Apr.....	4,969,481	8.09	3,458,940	3.35	804,235	0.25	Apr.....	34,729	15.98	24,132	11.98	117,394	189.69
May.....	5,056,779	3.31	3,438,037	4.51	913,877	1.84	May.....	.....	.....	.....	.....	.....	.....
June.....	4,983,112	1.71	3,466,384	3.49	870,919	12.12	June.....	39,889	12.83	24,992	11.61	116,770	57.67
July.....	4,841,635	3.24	3,499,609	3.02	631,791	7.21	July.....	41,484	11.27	25,961	11.24	116,819	49.64
Aug.....	4,582,572	3.27	3,419,932	3.90	423,123	9.03	Sept.....	.....	.....	.....	.....	.....	.....
Sept.....	4,693,503	2.91	3,366,543	2.51	597,074	15.27	Oct.....	.....	.....	.....	.....	.....	.....
Oct.....	5,115,259	1.56	3,534,811	1.05	849,014	11.88	.....	.....	.....	.....	.....	.....
Brooklyn & Queens Transit System, New York, N. Y.													
Oct., 1930....	1,922,388	5.20	1,597,166	5.50	214,924	7.74	Oct., 1930....	38,032	11.56	27,266	8.85	.....	.....
Nov.....	1,820,498	6.65	1,522,735	7.68	187,822	5.20	Nov.....	36,974	12.49	44,183	9.58	93,885	127.12
Dec.....	1,920,463	4.40	1,560,950	8.11	250,893	6.06	Dec.....	36,166	15.00	27,949	1.79	99,343	112.93
Jan., 1931....	1,849,644	6.18	1,541,235	7.58	197,355	3.02	Jan., 1931....	33,291	20.15	25,057	9.18	105,000	110.59
Feb.....	1,704,677	3.98	1,416,192	5.40	176,217	2.58	Feb.....	32,281	19.80	22,990	9.84	111,369	110.17
Mar.....	1,941,078	1.98	1,602,862	2.68	227,472	1.21	Mar.....	32,904	22.38	24,732	14.59	114,459	93.49
Apr.....	1,911,878	1.29	1,592,919	3.11	208,514	6.86	Apr.....	34,729	15.98	24,132	11.98	117,394	189.69
May.....	1,980,118	2.60	1,585,293	1.85	286,334	7.89	May.....	.....	.....	.....	.....	.....	.....
June.....	1,942,830	1.29	1,609,335	0.34	221,493	13.98	June.....	222,528	10.09	159,897	10.71	507,530	13.88
July.....	1,893,414	1.24	1,550,897	3.34	227,012	11.59	July.....	214,241	13.89	158,175	10.50	404,721	30.79
Aug.....	1,849,792	1.23	1,574,167	1.38	142,067	17.54	Aug.....	87,376	6.29	46,329	7.31	77,020	22.18
Sept.....	1,930,047	2.25	1,583,777	1.25	219,515	2.70	Sept.....	89,798	7.73	45,456	10.32	108,624	17.91
Oct.....	2,094,410	8.94	1,702,496	6.59	263,043	22.38	Oct.....	959,096	7.21	473,902	9.09	150,241	14.92
Capital Traction Company, Washington, D. C.													
Oct., 1930....	374,646	1.22	288,351	1.48	58,638	17.56	Oct., 1930....	1,033,584	4.33	521,325	1.97	176,999	17.79
Nov.....	346,054	2.70	273,481	1.54	42,659	11.05	Nov.....	994,735	6.18	489,761	4.08	169,465	21.42
Dec.....	369,885	1.77	274,221	3.21	67,651	0.61	Dec.....	1,060,614	4.86	419,109	17.40	306,321	12.49
Jan., 1931....	347,491	3.06	280,514	3.30	37,705	5.11	Jan., 1931....	1,005,022	7.82	512,350	7.23	157,098	21.78
Feb.....	312,815	3.47	252,080	5.68	30,521	1.87	Feb.....	936,542	6.67	467,137	8.09	134,717	16.34
Mar.....	344,191	2.65	270,962	3.88	43,847	4.03	Mar.....	1,013,577	8.05	497,695	8.34	180,554	15.13
Apr.....	366,276	2.39	273,436	5.89	65,123	12.93	Apr.....	1,002,265	5.78	485,938	5.73	181,182	15.09
May.....	362,502	1.87	281,344	1.61	50,959	5.60	May.....	974,737	6.24	481,504	5.53	158,191	18.77
June.....	351,017	3.05	276,751	1.84	45,841	12.14	June.....	941,598	4.82	477,392	4.41	128,896	16.23
July.....	306,826	0.10	258,341	1.52	9,438	91.25	July.....	897,211	6.00	470,918	6.28	91,288	21.80
Aug.....	264,135	16.02	251,657	6.29	17,408	208.00	Aug.....	875,376	6.29	463,292	7.31	77,020	22.18
Sept.....	276,418	15.65	236,952	11.61	9,452	63.76	Sept.....	897,981	7.73	454,556	10.32	108,624	17.91
Oct.....	4,345,717	10.94	3,326,457	15.43	795,929	3.99	Oct.....	959,096	7.21	473,902	9.09	150,241	14.92
Chicago Surface Lines, Chicago, Ill.													
Oct., 1930....	4,879,570	10.79	3,933,416	7.35	799,118	11.69	Oct., 1930....	691,672	2.54	506,107	2.41	148,701	11.61
Nov.....	4,537,647	13.48	3,769,538	6.86	712,177	20.77	Nov.....	542,672	11.02	430,907	6.24	80,529	23.11
Dec.....	4,846,000	8.09	3,984,572	9.69	767,348	15.67	Dec.....	577,425	13.63	421,987	14.26	127,388	5.66
Jan., 1931....	4,576,133	12.65	3,825,964	5.37	718,129	21.00	Jan., 1931....	509,641	20.77	395,953	19.80	87,742	9.85
Feb.....	4,234,704	10.90	3,665,038	6.04	601,726	15.44	Feb.....	498,067	8.89	388,126	3.81	84,381	2.26
Mar.....	4,584,224	4.35	4,287,237	5.34	557,167	15.05	Mar.....	568,653	1.95	398,855	5.94	143,325	28.98
Apr.....	4,759,624	4.46	4,092,047	0.36	675,629	11.66	Apr.....	547,992	7.17	395,315	6.46	127,179	3.24
May.....	4,541,847	9.38	3,802,582	4.61	724,514	12.88	May.....	581,953	4.34	389,538	8.87	162,905	13.83
June.....	4,348,896	8.76	3,629,943	5.36	664,122	14.51	June.....	581,093	1.58	398,980	15.89	154,417	90.05
July.....	4,093,702	9.74	3,579,566	5.98	580,118	10.55	July.....	550,906	8.41	395,741	16.33	123,420	40.89
Aug.....	4,018,958	10.45	3,502,795	7.74	589,056	10.34	Aug.....	597,050	9.75	403,603	13.54	156,770	2.58
Sept.....	4,061,261	11.14	3,307,020	12.73	684,161	4.88	Sept.....	535,497	18.18	386,035	15.12	116,501	27.59
Oct.....	4,345,717	10.94	3,326,457	15.43	795,929	3.99	Oct.....	.....	.....	.....	.....	.....	.....
Department of Street Railways, Detroit, Mich.													
Oct., 1930....	1,579,476	25.84	1,458,238	14.91	22,933	91.71	Oct., 1930....	6,315,679	1.13	4,162,660	0.83	181,417	7.14
Nov.....	1,481,136	23.35	1,333,571	15.38	4,890	98.14	Nov.....	5,965,365	4.96	3,869,340	0.00	272,021	121.79
Dec.....	1,610,179	22.59	1,440,503	8.87	23,052	77.93	Dec.....	6,477,864	0.52	4,194,315	3.96	293,152	47.40
Jan., 1931....	1,550,656	28.54	1,421,575	20.95	12,759	91.44	Jan., 1931....	6,123,6					

Trend of Revenues and Expenses by Months (*Concluded*)

	Increase or Decrease \$ Per Cent*	Operating Revenue \$	Operating Expenses and Taxes \$	Increase or Decrease \$ Per Cent*	Net Income \$*	Increase or Decrease \$ Per Cent*		Increase or Decrease \$ Per Cent*	Operating Revenue \$	Operating Expenses and Taxes \$	Increase or Decrease \$ Per Cent*	Net Income \$*	Increase or Decrease \$ Per Cent*	
Kansas City Public Service Company, Kansas City, Mo.														
Oct., 1930.....	724,125	4.89	570,892	7.93	68,983	3.13	Oct., 1930.....	1,456,688	4.03	1,205,455	9.73	36,257	317.06	
Nov.....	706,577	5.29	572,066	7.04	58,994	5.69	Nov.....	1,373,335	5.37	1,146,168	10.17	12,079	130.15	
Dec.....	758,045	1.73	570,065	14.58	108,444	284.88	Dec.....	1,438,752	3.49	1,197,249	8.51	26,250	186.44	
Jan., 1931.....	711,215	6.52	577,741	12.67	61,108	137.10	Jan., 1931.....	1,393,054	6.10	1,178,797	9.14	1,594	96.33	
Feb.....	640,676	8.87	537,583	9.72	27,392	149.06	Feb.....	1,274,832	4.27	1,070,307	8.56	11,143	126.49	
Mar.....	216,637	2.68	577,319	7.25	66,013	72.81	Mar.....	1,418,429	3.38	1,174,984	6.86	27,364	430.88	
Apr.....	709,515	0.68	565,328	6.23	71,298	99.32	Apr.....	1,408,235	3.25	1,155,880	5.98	44,331	250.25	
May.....	701,286	2.37	562,482	7.66	64,474	114.33	May.....	1,464,031	4.29	1,072,584	7.70	76,972	32.40	
June.....	655,957	0.17	540,187	6.23	42,677	683.20	June.....	1,440,848	2.88	1,145,871	6.19	79,746	76.91	
July.....	613,628	3.19	533,084	9.23	6,643	119.18	July.....	1,394,973	2.43	1,140,036	5.96	41,829	1,924.08	
Aug.....	600,311	6.57	518,559	2.18	6,122	247.05	Aug.....	1,302,353	3.53	1,087,507	7.90	1,067	129.27	
Sept.....	603,215	7.21	523,601	0.14	6,503	87.06	Sept.....	1,328,192	7.00	1,070,866	8.28	46,099	1.01	
Oct.....	634,307	12.40	537,940	5.77	22,378	67.56	Oct.....	1,429,787	1.85	1,134,793	5.87	77,559	113.91	
Long Island Railroad, New York, N. Y.														
Oct., 1930.....	3,371,761	6.80	2,446,346	8.97	729,067	1.77	Oct., 1930.....	531,803	13.76	439,896	...	41,223	55.80	
Nov.....	2,954,624	4.20	2,249,258	14.66	483,180	89.15	Nov.....	506,318	14.68	439,930	12.83	16,958	54.37	
Dec.....	2,905,045	6.60	2,130,182	16.27	596,812	47.11	Dec.....	559,363	13.02	460,420	21.92	51,623	889.51	
Jan., 1931.....	2,763,421	6.65	2,210,263	9.65	321,141	6.00	Jan., 1931.....	543,940	13.39	493,596	12.94	372	95.68	
Feb.....	2,561,169	7.43	2,074,216	9.13	332,002	3.88	Feb.....	482,566	14.30	437,444	13.02	4,503	150.71	
Mar.....	2,841,915	3.09	2,234,418	9.00	449,501	24.64	Mar.....	524,299	10.44	480,958	9.38	6,233	265.73	
Apr.....	2,976,402	4.69	2,269,029	7.87	533,425	1.97	Apr.....	510,645	9.39	470,964	7.60	9,992	455.60	
May.....	3,212,765	4.00	2,338,313	8.03	695,032	9.93	May.....	509,278	10.64	474,803	7.52	15,021	168.13	
June.....	3,414,354	6.78	2,351,016	7.26	907,010	5.76	June.....	482,703	9.40	438,362	8.15	4,633	201.09	
July.....	3,629,561	9.69	2,594,463	2.75	783,315	32.76	July.....	462,601	10.24	436,574	4.84	22,069	502.72	
Aug.....	3,513,473	11.48	2,504,287	6.04	781,691	32.08	Aug.....	445,932	10.15	420,929	4.78	23,467	744.17	
Sept.....	3,167,769	11.75	2,346,113	5.94	592,638	34.26	Sept.....	455,562	7.65	413,926	4.63	6,184	173.83	
Oct.....	.....	.....	.....	.....	.....	.....	Oct.....	486,528	8.51	423,433	3.74	15,797	61.68
Market Street Railway, San Francisco, Cal.														
Oct., 1930.....	786,012	6.73	675,908	6.49	57,384	45.58	Oct., 1930.....	1,354,086	7.28	1,049,306	4.84	25,163	71.16	
Nov.....	729,407	8.81	615,613	6.18	60,457	29.25	Nov.....	1,263,811	10.26	983,047	7.40	9,200	87.30	
Dec.....	775,508	5.18	639,249	5.52	83,460	0.03	Dec.....	1,350,553	8.19	1,043,315	7.25	36,700	54.64	
Jan., 1931.....	738,092	5.55	641,519	1.83	45,011	12.31	Jan., 1931.....	1,268,536	10.90	994,411	11.89	7,388	69.22	
Feb.....	668,931	8.17	576,661	8.22	41,002	7.29	Feb.....	1,136,604	15.78	891,421	15.97	24,088	31.15	
Mar.....	757,960	8.40	633,346	6.81	72,828	0.05	Mar.....	1,262,429	14.90	981,026	14.76	12,212	84.94	
Apr.....	745,252	6.72	620,106	7.06	73,837	3.46	Apr.....	1,253,764	13.50	966,424	13.58	11,440	82.93	
May.....	733,105	7.60	619,934	8.21	62,805	2.08	May.....	1,256,334	13.78	991,107	11.93	2,206	96.99	
June.....	704,769	5.19	654,225	1.75	37,384	11.62	June.....	1,195,126	10.29	963,857	7.69	31,952	198.96	
July.....	700,996	4.68	598,082	7.97	52,186	60.40	July.....	1,105,980	10.55	946,646	1.86	117,691	918.99	
Aug.....	726,480	5.69	607,925	5.60	68,175	6.61	Aug.....	1,038,314	13.34	947,614	1.76	180,963	3,057.40	
Sept.....	700,563	6.00	581,479	7.23	68,712	6.15	Sept.....	1,084,246	14.07	946,909	4.91	133,449	1,427.85	
Oct.....	725,458	7.70	614,327	9.38	61,010	6.32	Oct.....	1,175,854	13.16	.....	.....	110,345	533.52
New York & Queens County Railway, New York, N. Y.														
Oct., 1930.....	\$77,037	2.79	\$74,388	0.95	\$2,117	51.69	Oct., 1930.....	Operating Revenue \$	Operating Expenses \$	Gross Taxes \$	Net Income \$	Operating Revenue \$	Operating Expenses \$	
Nov.....	71,339	4.29	64,840	12.17	6,348	553.52	Nov.....	1,049,306	4.84	25,163	71.16	Nov.....	1,043,315	7.25
Dec.....	76,330	3.21	75,421	2.76	839	85.64	Dec.....	983,047	7.40	9,200	87.30	Dec.....	981,421	15.97
Jan., 1931.....	75,130	5.09	76,716	7.78	1,713	120.85	Jan., 1931.....	1,263,811	10.26	1,043,315	7.25	Jan., 1931.....	1,043,315	7.25
Feb.....	67,321	5.47	63,363	6.44	3,694	18.97	Feb.....	1,350,553	8.19	1,136,604	15.78	Feb.....	1,136,604	15.78
Mar.....	74,890	3.41	72,370	6.16	365	56.60	Mar.....	1,268,536	10.90	981,026	14.76	Mar.....	981,026	14.76
Apr.....	74,339	3.95	73,379	2.15	707	126.84	Apr.....	1,262,429	14.90	981,026	14.76	Apr.....	981,026	14.76
May.....	80,601	2.07	72,852	3.59	6,081	11.12	May.....	1,253,764	13.50	966,424	13.58	May.....	966,424	13.58
June.....	75,874	0.08	69,642	0.17	4,267	33.70	June.....	1,195,126	10.29	963,857	7.69	June.....	963,857	7.69
July.....	72,364	0.19	61,934	8.15	9,301	124.07	July.....	1,105,980	10.55	946,646	1.86	July.....	946,646	1.86
Aug.....	65,455	6.87	61,722	11.32	2,452	1,111.93	Aug.....	1,038,314	13.34	947,614	1.76	Aug.....	947,614	1.76
Sept.....	63,953	15.74	57,815	17.08	4,703	14.77	Sept.....	1,084,246	14.07	946,909	4.91	Sept.....	946,909	4.91
Oct.....	67,055	12.95	57,314	22.95	8,372	295.46	Oct.....	1,175,854	13.16	Oct.....	1,175,854	13.16
New York, Westchester & Boston Railway, New York, N. Y.														
Oct., 1930.....	202,046	7.52	138,192	14.09	190,748	20.81	Oct., 1930.....	Operating Revenue \$	Operating Expenses \$	Gross Taxes \$	Net Income \$	Operating Revenue \$	Operating Expenses \$	
Nov.....	184,690	8.74	170,542	2.52	216,451	19.76	Nov.....	1,354,086	7.28	1,049,306	4.84	1,354,086	7.28	
Dec.....	190,136	12.31	138,592	17.80	205,029	16.75	Dec.....	1,263,811	10.26	983,047	7.40	1,263,811	10.26	
Jan., 1931.....	182,249	13.76	160,800	9.44	220,394	32.37	Jan., 1931.....	1,350,553	8.19	1,043,315	7.25	1,350,553	8.19	
Feb.....	161,311	15.02	149,571	11.18	222,308	29.42	Feb.....	1,268,536	10.90	994,411	11.89	1,268,536	10.90	
Mar.....	181,729	12.80	144,442	3.54	195,802	24.37	Mar.....	1,262,429	14.90	981,026	14.76	1,262,429	14.90	
Apr.....	186,708	13.03	142,832	0.31	189,142	19.00	Apr.....	1,253,764	13.50	966,424	13.58	1,253,764	13.50	
May.....	195,905	15.11	149,268	0.42	186,389	25.70	May.....	1,195,126	10.29	963,857	7.69	1,195,126	10.29	
June.....	193,820	14.62	142,600	3.45	183,007	23.70	June.....	1,105,980	10.55	946,646	1.86	1,105,980	10.55	
July.....	195,461	12.92	146,820	0.40	188,581	23.55	July.....	1,038,314	13.34	947,614	1.76	1,038,314	13.34	
Aug.....	186,965	8.79	142,111	6.62	197,099	6.55	Aug.....	1,084,246	14.07	946,909	4.91	1,084,246	14.07	
Sept.....	181,828	10.70	137,940	16.53	191,542	0.68	Sept.....	1,175,854	13.16	.....	.....	1,175,854	13.16
Oct.....	184,144	8.86	142,401	3.04	194,351	1.89	Oct.....	.....	.....	.....	.....	1,175,854	13.16
Northwestern Pacific Railroad, Sausalito, Cal.														
Oct., 1930.....	555,867	18.49												

NEWS of the Industry

Improvement Projects

Birmingham, Ala.—The Birmingham Electric Company will rush the laying of its new double tracks through the Twentieth Street underpass, one of a series of underpasses now nearing completion. The laying of this trackage will place the north and south cars back on their original routes. The rerouting involved during the progress of the work has slowed up service.

Seattle, Wash.—Municipal Street Railway track construction necessary early next year as part of the University Bridge improvement program will cost \$26,000. This will be in addition to the \$675,000 in general obligation bonds which the people voted a year ago last March for replacement of the present wooden approaches with wider structures of steel and concrete.

Lynchburg, Va.—City Manager R. W. B. Hart, J. H. Pritchard, general manager, and C. B. Fockler, engineer in charge of construction of Lynchburg Traction & Light Company, have conferred about the improvement of Rivermont Avenue between Belmont and Belvedere Streets. For this purpose, the Council has set aside \$100,000. A proposal has been advanced to set back the curb lines 18 in. on each side of the street in order to provide room for an automobile to pass between a street car and a vehicle parked at the curb. It is proposed also to pave the 2-mile stretch with concrete. This would necessitate the raising of the street car rails 3 in., thus permitting the city to put down a concrete surface over the present base.

New York, N. Y.—The Board of Transportation will receive bids on Dec. 11 for station and tunnel lighting in the Queens link from Manhattan to 36th Street and Queens Boulevard and also the Brooklyn crosstown line of the new city subway from Court Square, Long Island City to Nassau Avenue, Brooklyn.

San Francisco, Cal.—Work has started on the construction of the new Balboa Street extension of the Market Street Railway, to which reference was made in ELECTRIC RAILWAY JOURNAL for Nov. 14. The work will consist of 2.85 miles of double track between Turk and Divisadero Streets on the east and Balboa Street and 31st Avenue on the west. The first step is the preparation by the regular overhead line crews of the company of pole and transmission line work. It is estimated that the entire job will cost \$400,000. It is planned to begin work at Sixth Avenue and Balboa Street and work westward, timing the job so that the company will be ready to do the final piece of track on the east end by the time the city has finished regrading Turk Street west of Divisadero Street.

Plans for New Year Made by A. E. R. A. Executive Body

Plans for activities during the coming year were discussed at the first meeting of the new Executive Committee of the American Electric Railway Association held at association headquarters, New York City, on Nov. 20. President Richardson announced the reappointment of C. D. Cass as general counsel of the association. The names of the members of the advisory council to serve during the coming year were also announced.

Before proceeding with its regular business, the committee listened to a short talk by Malcolm Muir, president of the McGraw-Hill Publishing Company, Inc., concerning the plan to change the name of ELECTRIC RAILWAY JOURNAL at the beginning of next year. Mr. Muir pointed out that both the industry and the paper have greatly broadened the scope of their activities in recent years and have outgrown a designation that appears to embrace only one particular form of transportation. He said that no other word so well describes the tremendously important business of furnishing transportation in our cities and adjacent areas as does the word "transit." Electric street railways, subways, elevated railways, buses, trolley buses, taxicabs, interurban electric lines and electrified suburban railroad lines, are all included within its scope.

Following Mr. Muir's talk, there was

general discussion as to whether or not it would be desirable to embody the word "community" in the new name, but the consensus of opinion was that the two-word name TRANSIT JOURNAL would be best. While no official action was taken by the committee, it was evident that the general sentiment approved the proposed change.

In connection with the report of the Manufacturers' Advisory Committee, which

(Continued on Page 715)

Evansville Company Starts Another Bus Service

The Evansville, Suburban & Newburgh Railway has started bus service between Evansville and Petersburg, Ind., by way of Boonville. For more than a year the company has maintained bus service between Evansville and Boonville, replacing rail service. Three trips daily are being made now by the buses between Evansville and Petersburg. The new service covers 36 miles and taps the rich coal field of Pike County and northern Warrick County. The railway will also start a daily freight service between Evansville and Petersburg. President Muhlhause feels that the new service will be profitable. The company also operates buses between Evansville and Newburgh. Some time ago the Public Service Commission approved the plan for the new Evansville-Petersburg route, but operation over it has been held up until the present time pending repair of a bridge 3 miles south of Arthur. The route is over Road No. 62 to Boonville, and over Road No. 61 from Boonville to Petersburg. Part of the route is concrete pavement, and the rest of it has been improved with dustless top.

Tow-in Law Under Fire in Indianapolis

The Business Outlook

SOME slackening of the rate of bank credit contraction, slowing up of currency expansion and bank suspensions, strengthening of the dollar and mark exchanges, accelerated action on German reparations and debt problems by the creditor powers hold out promise that the period of acute financial disturbance which has complicated the depression may be definitely past by spring. Security markets are standing well the postponement of railroad wage adjustments, the pressure of tax selling and poor corporation earnings results and the commodity markets continue steady despite the dampening of their earlier inflationary enthusiasm. In short, with steel and motors apparently most hopeful of keeping some of the home fires burning in anticipation of spring improvement, business would seem to be prepared to dig in for the winter and watch the coming congressional carnival of political winter-sports in Washington.—*The Business Week*.

Several groups of Indianapolis citizens are waging bitter warfare against enforcement of the city's recently enacted tow-in law which permits the police to impound autos parked improperly on the city streets. Although city officials have shown a willingness to meet with committees representing citizens and discuss measures alternative to the tow-in, Mayor Sullivan is on record as irrevocably opposed to a return to the old sticker system. The Mayor recently was quoted as saying that newspapers and business men who most actively oppose the tow-in ordinance are the ones who most frequently "fixed" stickers in former days. It is his opinion that the city will benefit materially under a parking code with an enforcement rule that possesses teeth.

Fare Changes

Youngstown, Ohio—Weekly sales of car and bus passes under the \$1 rate continued to increase, according to Youngstown Municipal Railway officials. The sales for the week recently ended were 7,400, compared to 7,362 the previous week and 7,013, the first week of the reduced rate. The three-month trial of the \$1 rate still has two months to go.

Newark, N. J.—The Lackawanna Railroad has made a further reduction in round-trip tickets to Newark and New York within the new suburban electric zone, effective Dec. 1. The new price is equal to the approximate cost of a one-way ticket. Tickets will not be honored on morning and evening rush-hour trains. They will be on sale daily from Dec. 1 to Dec. 24. Tickets will not be sold at reduced rates in the opposite direction. The reduced fares are experimental. New prices are \$1.45 to New York and \$1.20 to Newark from Dover, and \$1.35 to New York and \$1.10 to Newark from Rockaway.

Toledo, Ohio.—The Street Railway Board of Control has approved plans of the Community Traction Company to issue shoppers' passes to be sold for a week's riding at 75 cents. The passes probably will be issued the last week in November, but no definite time has been set by the company. The shoppers' pass will be honored on all cars and buses between 9 a. m. and 4 p. m. and from 6:30 p. m. to 3 a. m.

Bus Operations

Tuckahoe, N. Y.—The East Chester Town Board has suggested that the Third Avenue Railway System substitute buses for trolleys on the Waverly Square-Mount Vernon route. The company plans to run buses from White Plains to Mount Vernon, and will extend the New Rochelle-Tuckahoe route, which now terminates at Mill Road and White Plains Post Road, East Chester, to the railroad station in Tuckahoe.

Savannah, Ga.—The Savannah Electric & Power Company would substitute service by bus for its present Battery Park car service operating regular city type buses over the new route, furnishing substantially the same frequency of service. This proposed service would transverse three present car lines, enabling passengers to transfer to and from any one of these lines. It would make a shorter and more direct route for passengers from the southern and eastern sections of the city wishing to visit Laurel Grove Cemetery and the southwestern section of the city. The fare would be the standard car fare with the usual free transfer privilege between car and bus service.

Cleveland, Ohio.—Pointing to the report of Street Railway Commissioner

C. M. Ballou which showed a loss of \$252,780 on bus operation during the first six months of 1931, City Councilman Kohen, suggests that the Cleveland Railway discontinue five bus lines and shorten four others in an effort to reduce the deficit. Legislation to this end has been prepared, but it is expected the movement will result in much opposition from business men and residents in the territory served.

Warren, Ohio.—If the P. & O. Coach Lines give Warren half-hour bus service at the same fare as now charged for street car transportation, the city will not protest the withdrawal of local railway service. It is said the city will insist that the company make some arrangement to remove the trolley tracks or resurface over them.

Roanoke, Va.—The State Corporation Commission has authorized the Roanoke Railway & Electric Company to remove 1.83 miles of track from a portion of the old Salem line which cuts off at Twentieth and Orange Streets and to substitute service by bus on the route to Washington Heights, which is about a mile from the city.

Boston, Mass.—The Boston Elevated Railway has asked for permission to establish two new bus lines in Dorchester. Fares will be 5 cents without transfer, and 10 cents with transfer privileges.

Service Changes

Oakland, Cal.—The application of the East Bay Street Railways, Ltd., for permission to reroute and consolidate street

Congratulations!

WE TAKE off our hat to Chairman John N. Shannahan and to the splendid body of men and women who assisted him in the Community Chest drive. And we take off our hat to Omaha — a mighty fine town, the home of a warm-hearted and public spirited citizenry.

In a year of unemployment, reduced wages and salaries, diminished profits, Omaha has given \$584,000, with the promise to make it an even \$600,000 before the campaign is over. It was asked to give \$525,000.

To the discharge of this civic duty Mr. Shannahan has given, not only freely of his money, but, more valuable and more important, the whole of his time and energy and ability for several weeks. Many other citizens, with businesses and private affairs of their own clamoring for attention, have done almost as much.

It is men and women such as these who build fine cities and help make this a great and enduring nation which not all the winds that blow can move from its foundations.

—*Omaha World-Herald*.

car lines Nos. 11 and 15, serving 38th and Oakland Avenues, has been denied by the State Railroad Commission.

Providence, R. I.—Discontinuance of railway service on the Promenade Street line here is sought in a petition filed by the United Electric Railways with the Public Utilities Commission. The petition involves only trolley service—not bus service—on Promenade, Valley and Rathbun Streets.

Berkeley, Cal.—The East Bay Street Railways, Ltd., and East Bay Motor Coach Lines, Ltd., have petitioned the Railroad Commission, the one to abandon a portion of its railway service on its No. 3, Grove Street Line, in Berkeley, and the other to operate a motor coach line in place of the service so abandoned. Authority is asked to remove the track since city officials are about to reconstruct portions of the streets, and have consented to the removal.

Wheeling, W. Va.—The Wheeling Traction Company has placed one-man cars in service between Martins Ferry and Yorkville.

Rochester, N. Y.—Twenty-two one-man cars have been placed in operation on the Main Street East and Main Street West line and the Parsells Avenue and Genesee Street route of the New York State Railways. John F. Uffert, general manager, explains that the one-man service provides more frequent service on the lines in face of declining revenues. The cars have been newly decorated inside and out. The seats are upholstered in red leather. With the installation of these new one-man cars, this class of service is being operated on all but four of the city lines.

Portland, Ore.—Drastic changes in Oregon Electric Railway passenger schedules have been announced by R. H. Crozier, general passenger agent. Between Albany and Corvallis, buses will be used instead of the rail connection from Gray to Corvallis.

Financial News

Brooklyn, N. Y.—According to the *Wall Street Journal*, the Brooklyn-Manhattan Transit Corporation has so increased its holdings of Brooklyn & Queens Transit Corporation common and preferred stocks that in October the holding company received approximately 61 per cent of the surface line operating company's net income, against roughly 58 per cent in the first four months of its fiscal year and 58.3 per cent in September. In September the company added to its holdings of both common and preferred stocks of Brooklyn & Queens Transit. In addition, the Brooklyn-Manhattan Transit's income has been increased by the raising of the Brooklyn & Queens Transit preferred dividend to \$6 a share from \$5. The first quarterly payment at the higher rate was made Oct. 1.

(Continued on Page 714)

Reorganization Plan for Buffalo & Lackawanna

The Public Service Commission has approved the reorganization plan for the Buffalo & Lackawanna Traction Company, and has authorized that company to issue common capital stock of no par value.

The Buffalo & Lackawanna operates from the Buffalo Library to a connection at the city line with the Buffalo & Lake Erie Traction Company, which controls the Buffalo & Lackawanna through ownership of stock. The Buffalo & Lake Erie went into receivership and the property of the Buffalo & Lackawanna reverted to its bondholders. Later the property was sold to Harry Evers as chairman on behalf of a protective committee of bondholders.

The reorganization plan proposed that depositing bondholders of the Buffalo & Lackawanna form a new corporation with an authorized capital of 15,000 shares of no par value common stock, consisting of 12,000 shares of Class A stock which would be distributed to bondholders in the ratio of ten shares for each \$1,000 principal amount of bonds, and 3,000 shares of Class B stock designed to secure competent management. The purpose of the reorganization plan was said to be to transfer to the bondholders their interest in the property purchased on their account at the foreclosure sale.

The commission authorized the company to issue 11,450 shares of Class A stock without par value, to be delivered to the Marine Trust Company, Buffalo, as depository under the bondholders' protective agreement for delivery to depositing bondholders. The issuance of Class B stock in payment for services in advance of their being rendered was not approved. It was stated by the commission that the purpose of rewarding management can be accomplished by assigning a proportion of the net income to management and determining the order of such distribution.

New York's Largest Subway Station Inspected

The 42d Street station of the Eighth Avenue line of New York City's new subway system was inspected recently in its partially completed state in conjunction with the tour conducted by the Eighth Avenue Association. This is the largest subway station in this city. It has a capacity of about 90,000 passengers an hour. The station has a total length of 1,155 ft. When finished, it will have fourteen entrances from the street, two of which will be through adjacent buildings and one or more stairways at each of the intersecting streets leading from the sidewalk to the mezzanine or control level of the station.

Free Rides in Providence

To aid the Retail Trade Board of the Providence Chamber of Commerce on "Providence Day," Dec. 3, the United Electric Railways will bring passengers into the center of Providence, R. I., free of charge between 9 and 11 a.m. According to a petition filed with State Public Utilities Commission, the com-

pany is taking this step because it "desires to co-operate by giving free transportation in one direction on said day on all lines running into the traffic and business center of Providence."

All lines will be affected by the free-ride ruling except the Olneyville Square-Eddy Street and the Cranston Street-Branch Avenue bus lines. On the Pawtucket line only persons who board cars south of the city line will be entitled to the free transportation. Persons leaving cars or buses before reaching the center of the city also will be required to pay their fares.

A second petition filed by the company proposes to establish the same plan for the Pawtucket Chamber of Commerce on "Pawtucket Day," the date of which has not yet been set.

Department stores and other business establishments will feature large sales of merchandise at special prices on Dec. 3 in an effort to stimulate business.

Curbing the Cruising Cab in Hoosier City

The Indianapolis city ordinance limiting cruising by taxicabs and requiring all drivers to obtain licenses went into effect on Nov. 16. Passed last April, the ordinance has been held in abeyance at the behest of cab operators who have claimed that the ordinance provisions will seriously affect their business. Cruising for passengers is limited by a provision in the ordinance that all cabs must proceed two blocks before turning to repass a given spot. Other sections of the ordinance provide that cab stands may be authorized only by the Board of Public Safety. Property owners may petition for the establishment of a cab stand, but if the petition is granted the property owners will be required to pay a fee of \$25 yearly.

Central Association Activities Reorganized

Prompted by changed general conditions of the electric railway industry and the constantly increasing efficiency of its active subsidiary organizations, the Central Electric Railway Association, through its Executive Committee, has effected a complete reorganization of its activities. In two meetings at

Fort Wayne, Ind., Oct. 15 and Nov. 18, 1931, authorization was given to the Central Electric Railway Master Mechanics' Association, the Central Electric Railway Accountants' Association, and the Central Electric Traffic Association to organize as independent associations and to become active as such Jan. 1, 1932. These subsidiary organizations will assume the assets and liabilities of the parent association as of this date, and the Central Electric Railway Association will retire as of Dec. 31, 1931.

The organization now known as the Central Electric Railway Master Mechanics' Association will become the Central Transportation Equipment Association on Jan. 1, 1932. The accountants' and traffic associations will continue under their old names. It is believed by the officials of the central district railways that this reorganization in no way handicaps the various companies' interests in association affairs, but puts them in a stronger position to co-ordinate their activities through their subsidiary organizations.

The Central Electric Traffic Association immediately went into session following the parent Executive Committee's action in their behalf, and elected an Executive Committee for the period of one year. Those elected were as follows:

G. W. Quackenbush, traffic manager Eastern Michigan, Toledo Railroad.

O. H. Lazelle, traffic manager Lake Shore Electric Railway.

Richard Breckenridge, vice-president in charge of traffic Cincinnati & Lake Erie Railroad.

O. H. Muriin, general freight and passenger agent Dayton & Troy Electric Railway.

W. L. Snodgrass, general superintendent in charge of traffic Indiana Railroad System.

H. W. Smith, general freight and passenger agent Northern Indiana Railway.

J. O. Motto, traffic manager Winona Railroad.

Mr. Snodgrass was elected president of this committee and Mr. Lazelle, vice-president.

Income Bond Interest Omitted

The directors of the United Railways & Electric Company, Baltimore, Md., have decided not to pay interest due on Dec. 1 on the income bonds. The following resolution was passed at a meeting on Nov. 24:

Resolved that upon consideration of the report of the auditors and treasurer showing that for the six-month period ending Nov. 20, 1931, there will be no net earnings applicable to interest on the income bonds, coupon No. 65 be not paid.

The interest on these bonds, which were originally issued in exchange for preferred stock of the company, is cumulative. Since 1910 the company had made regular interest payments. Prior to that coupons for the period from 1904 to 1910 had been funded in a 5 per cent issue due June 1, 1936. The income bonds are without definite maturity date except that principal is payable at the option of the company after March 1, 1949.

Many Changes in Service

Changes in the street car and bus service of San Diego Electric Railway, San Diego, Cal., have been authorized by the Railroad Commission. The changes are in substantial accordance with recommendations contained in an investigation and report on the street transportation facilities of San Diego made by the Railroad Commission upon the joint request of the city and the railway. The commission said it appears unreasonable that the company can continue to operate cars unless a need for them, expressed in traffic, exists. The greater the economy of operation, the more assured is service. The importance of Ocean Beach, it is believed, is fully appreciated by the railway, as witnessed by the high type of service rendered this community. The transfer necessitated by the proposed change will be limited to a few passengers, while it will result in a material saving to the railway and permit a high standard of service.

A.E.R.A. Executive Committee

(Continued from Page 711)

is taking a poll of the manufacturers concerning the desirability of having an exhibit at the 1932 A.E.R.A. convention, a suggestion was made that no convention at all be held next year and a series of regional meetings be substituted in its place. Several of the members present expressed approval of this plan, but no formal action was taken, it being decided to canvass the opinion of the industry by letter before making any final decision.

Brief reports were received from various of the standing committees. President Heberle of the Accountants' Association, President Giltner of the Claims Association and President Jones of the Engineering Association told of the plans of their organizations for the coming year. A letter of appreciation was read from the Canadian Electric Railway Association for the courtesies extended to its members during the recent A.E.R.A. convention at Atlantic City. It was decided to hold the next meeting of the American Executive Committee on Jan. 29 at New York.

Financial News

New York, N. Y.—The city, acting through the Transit Commission, and the Interborough Transit Company have reached a settlement with the Department of Internal Revenue under which the Revenue Department has waived its claim for taxes amounting to approximately \$850,000 on the payment of approximately \$6,291,000 by the I.R.T. to the city for the fiscal year ended June, 1929. The payment was made under an agreement between the Interborough and the city, settling differences over accounting and fund withdrawals under Contract 3. *

Johnstown, Pa.—A protective committee for holders of Johnstown Passenger Railway 30-year 4 per cent gold bonds, due on Dec. 1, 1931, has been formed and is asking deposits of bonds. The Johnstown Traction Company, the parent company, is now in receivership, and has advised the bondholders of the Passenger Railway Company, with which it was merged in 1913, that it will not meet the interest due on Dec. 1, on which date the principal of the bonds also will mature. *

New York, N. Y.—Holders of the Dry Dock, East Broadway & Battery Railway 5 per cent general mortgage bonds, due on Dec. 1, 1932, have been informed that funds are not available for the payment of semi-annual interest. A total of \$950,000 of these bonds are outstanding. The Dry Dock company operates the Avenue B, the Williamsburgh Bridge and the Grand Street Crosstown lines. Third Avenue Railway, which controls the line, has met the deficit up to this time. Recently, however, it was decided not to advance further funds to the Dry Dock company, but it has offered its services to the Dry Dock bondholders to operate the lines at least until such time as the bondholders make other arrangements. The companies of the Third Avenue Railway system own certain Dry Dock securities. *

New York, N. Y.—As part of its program for independent operation of New York City's new subway system, the Board of Transportation plans to submit to the Board of Estimate, together with a draft of operating contract, a request for immediate service upon B.M.T. of intention to recapture the 7-mile Culver Line to Coney Island. *

Columbus, Ohio—Street railway and interurban lines come fourth in the amount of excise taxes paid the State for 1931. Steam railroads come first with \$2,198,105. Electric power corporations are next with \$1,088,188. Telephone companies are next with \$815,407, and street railway and interurban lines fourth with \$469,551. Excise taxes paid by all utilities for 1931 were \$312,364 less than for 1930. This indicates that all utilities combined have suffered a comparatively small decrease in gross revenue as compared to other businesses paying excise taxes to the State.

Providence, R. I.—The New England Power Association, through a subsidiary just formed, the Power Realty Company, is to acquire the power plant of the United Electric Railways here for \$2,150,000. Hereafter, the transportation utility, which operates trolley and bus lines throughout Rhode Island's mainland, will purchase its power from the Narragansett Electric Company, another subsidiary of the New England Power Association.

Regulation and Legal

Philadelphia, Pa.—Right of the State Superior Court to decide whether the Broad Street Subway lease by the city to the Philadelphia Rapid Transit Company is "improvident to the taxpayers" was asserted on Nov. 11 by Superior Court Judge Cunningham. The ruling was made in the course of argument before the tribunal on the appeal of former Deputy Comptroller Wilson from the Public Service Commission's approval of the Broad Street Subway lease a year ago. Mr. Warfield said: "I do not ask that the entire lease be nullified, but I ask this court, in view of the fact that the agreement was drawn at a time when Mitten Management, Inc., was in control of the P.R.T., to send the lease back to the Public Service Commission so that proper adjustments may be made." Decision was reserved. *

East Chicago, Ill.—A new trial has been granted the Chicago, South Shore & South Bend Railroad in its legal battle to move its tracks here from crowded Chicago Avenue in the center of the business district to a new location near the south bank of the Little Calumet River. Circuit Judge Norton ruled that an act of the recent Legislature revoked the original law which gave the utility the right to relocate tracks, and invested this right in the Public Service Commission. In the first trial, Judge Norton denied the petition of the company to move its right-of-way. The company then filed a similar petition with the Public Service Commission.

General

Seattle, Wash.—By a unanimous vote the City Council has instructed the Board of Public Works to pave with precast concrete slabs the open street car tracks of the Municipal Street Railway on Dexter Avenue. The work will probably be underway by Dec. 1, to prepare Dexter to handle all the traffic to and from the south end of the new George Washington Memorial Bridge during the first several months after its opening next spring. The work will cost \$40,000 and will involve reconstruction of the double-track street car line in the center of the avenue before the concrete surfacing slabs can be laid. The estimated cost does not include new railroad ties and rails to be used. The improvement will be financed from money left over in the public fund originally contributed to build the new bridge.

(Continued on Page 716)

Six-Hour Day Plan at Detroit Rejected

The railway employees' union in Detroit has rejected the recent proposal made by the Department of Street Railways for a six-hour day instead of the present eight-hour day. It put forward a counter-proposal for a 6-day work schedule instead of seven days. The plan of the department as submitted to the union was designed to spread employment among more of the extra men. The union proposed that all extra work in other departments be given to the platform men not on regular runs, a system tried out earlier in the year but abandoned last March.

Del A. Smith, general manager of the D. S. R., said that a six-day week might prove satisfactory if the off-days could be rotated and not all taken on Sundays.

The problem of increasing shop hours for D. S. R. men to 30 hours a week is being considered by Joseph E. Mills and Judge Jeffries, named several weeks ago to settle the question of shop hours.

Special Cleveland Pass Popular

A Sunday-holiday pass put into effect at Cleveland on Nov. 22 by the Cleveland Railway sells for 25 cents in competition with the following fares in different parts of Greater Cleveland:

City of Cleveland—10 cents cash and four tickets 30 cents with 1 cent transfer. East Cleveland and Cleveland Heights—local fares same as Cleveland but through rides cost 12 cents cash or five tickets for 45 cents.

Euclid Village—5 cents local and 18 cents through.

Lakewood—5 cents and eleven for 50 cent ticket local, but with Cleveland fares for through rides.

The company sold 16,130 passes, which were used for 134,074 gross rides. The latter included transfers which ordinarily run up to 35 per cent. The revenue for the day was \$905 greater than for the average of the three Sundays preceding, viz.:

Nov. 1	\$19,375
Nov. 8	\$19,764
Nov. 15	\$18,286
Average	\$19,142
Nov. 22 (pass)	\$20,047

Gain in revenue (per cent).....4.8

The company's move to popularize service on the days on which patronage has declined most has met with wide commendation.

Fast Bus Service to Los Angeles Harbor

A direct motor coach service is being supplied by the Los Angeles Motor Coach Company between Hollywood and San Pedro, Long Beach and steamers at the Los Angeles Harbor. The new line is the most important new transportation link added in southern California in several years, since it provides through service between the Hollywood and harbor points and fulfills a travel need which has been growing constantly. Permission to operate the new line was received from the Railroad Commission only after hearings lasting several weeks. Four companies competed for the franchise.

Following a course from the heart of Hollywood over the westerly and southerly section of the city, the line passes through a thickly populated district of Los Angeles en route to the harbor. The line to Long Beach diverges, one wing serving Torrance and the other operating direct on South Main Street to Long Beach.

The schedule calls for six round trips daily between Hollywood and Long Beach, five round trips to San Pedro and a number of trips to and from steamers at the docks sufficient to handle the business offered. The running time is one hour and twenty minutes for the 32-mile journey to

Long Beach, and one hour and fifteen minutes for the 30.5-mile trip to San Pedro.

The round-trip fare between Hollywood and Long Beach is \$1.10 and the one-way fare 60 cents; between San Pedro and Hollywood 55 cents one way and \$1 round-trip.

The service saves time and eliminates transfer enroute between Hollywood cars and Pacific Electric interurban trains in Los Angeles, previously the only transportation medium to the harbor. The Los Angeles Motor Coach Company is owned and operated jointly by the Pacific Electric Railway and Los Angeles Railway.

Costs Reduced Sharply, Say Maintenance Men

At well-attended meeting of Middle Atlantic States Equipment Association many improved practices are discussed

NEW cars and new types of equipment require proper devices for repair and testing if satisfactory results are to be obtained was the opinion of those who spoke at the fall meeting of the Middle Atlantic States Equipment Mens' Association, held at York, Pa., on Nov. 19 and 20. The sessions were presided over by J. G. Porter, Richmond, Va., president of the association.

Three principal papers were presented, by J. K. Stotz, Westinghouse Electric & Manufacturing Company, on recent developments in high-speed railway motors; George H. Scragg, Mack-International Motor Truck Company, on schedules; and R. S. Beers, General Electric Company, on testing of railway motor fields. In Mr. Beers' absence the last paper was read by G. R. Hill.

COMMUTATION AND MODERN RAILWAY MOTORS

One of the principal problems in the modern railway motor, according to Mr. Stotz, is commutation, which is made more difficult with higher accelerating rates and higher speeds. The penalty is less life between commutator turnings. The biggest offender in producing noise is the gear. The new drives, both the W-N type and the worm, are quiet, but to some extent are dependent on the type of truck with which they are used. Throughout its life the double-reduction gear has the same efficiency as the single.

In the discussion it was brought out by several speakers that the new types of equipment have brought new problems in maintenance. D. E. Frame, Wilmington, Del., believes that shops must be fitted with the proper devices for repairing and testing. This opinion was concurred in by Mr. Porter, W. J. Hicks, Richmond; Morris Buck, New York, and others.

Maintenance costs have been reduced 53 per cent and pull-ins reduced 93 per cent in Richmond, according to Mr. Galloway. A wheel grinder and lathe have been effective in improving wheel maintenance. Construction of a new bus repair shop has resulted in a reduc-

tion in bus maintenance costs of \$18.50 per 1,000 bus-miles, and pull-ins have gone down 50 per cent.

Considerable discussion developed on methods of reducing maintenance costs at the present time. A. T. Clark, Baltimore, stated that use of new cars has reduced maintenance costs. The purchase of an automatic welder has reduced the car-mile cost of car wheels. Careful adjustments have reduced brake-shoe costs. Adoption of steel cars and a new technique have brought down the cost of repairs after damages in accidents. The total of these savings has been nearly \$160,000 in nine months.

H. A. Leonhauser, Baltimore, told how the use of high-speed steels made it possible to speed up the machinery. A case-hardening plant was installed, and the life of the parts treated was increased four to one. Welding is used to reclaim every possible part, with a considerable saving.

E. L. Kelly, Hampton, pointed out that the cost of special shop equipment is a real problem on the small property, and much of it is out of the question. Fred T. Ward, Third Avenue Railway, New York, told of the efficiency studies made on his property. By the use of improved methods, 89 men are now able to repair and turn out six treadle-door cars in five days where formerly five cars were turned out in five days with 100 men. There has been no let-down in the quality of the work. An analysis tells in advance what a job will cost, and how permanent it will be. The real gain that is being made in maintenance by these improved methods, Mr. Ward said, is in putting parts on the cars that will not wear out quickly.

Friday morning's session was devoted entirely to the discussion of prepared questions. W. C. Klein, Allentown, stated that he has been using the trolley shoe exclusively for the past ten years on all high-speed cars. It has eliminated all wire troubles and broken car roofs. It also is much better in sleet. E. G. Deis, Ohio Brass Company, discussed

(Continued on Page 717)

Progressive Moves Made by P.R.T. on Improvements

John A. McCarthy, banker and chairman of the City-Company Relationship Committee of the Philadelphia Rapid Transit Company board, in discussing a number of important transit improvements projected by the company, indicated that modernization of the 1907 city-P.R.T. transit agreement is to be sought by the reorganized P.R.T. board of directors in the near future. According to the *Record*, these improvements include:

1. Inauguration of a high-speed transit service between Philadelphia and Camden via the Delaware River Bridge.

2. Inauguration of a new bus line to connect the Roxborough-Wissahickon section with the central business district via the Henry Avenue Bridge.

The P.R.T. board of directors has also named a committee of four to discuss with the city the proposal that the transit company keep trolley tracks off Ridge Avenue, east of Broad Street.

The committee comprises Mr. McCarthy, Dr. Herbert V. Tily, P.R.T. director and president of Strawbridge & Clothier; Ralph T. Senter, president of the railway, and Frederic L. Ballard, its general counsel.

Mr. McCarthy said it is the intention of the reorganized P.R.T. board of directors to take the public into its confidence with respect to the various problems arising in the conduct of its transportation system and the relationship of the city and the P.R.T. To this end a Publicity and Public Relations Committee has been named to accomplish this purpose. The committee comprises Dr. Tily, Mr. McCarthy and George Stuart Patterson, three of the six men appointed last May to the P.R.T. board by Judge McDevitt. Mr. McCarthy is quoted as follows:

It is the intention of the P.R.T. to extend to the limit of its ability the best available transit service to the people of Philadelphia.

In line with this attitude, the company has started negotiations with the city to establish a bus line from the Wissahickon Station of the Reading Company out Ridge Avenue to City Line. The franchise covering this route is held by the Reading Transit Company, which operates a trolley line out Ridge Avenue to Norristown.

We expect to break even on the operation of this new bus line for the present. We won't make a penny for the next few years, at least, in its operation. It will undoubtedly aid tremendously in the development of the entire Roxborough district, and give the section a transit service now lacking because of the unsatisfactory operation of the present "Toonerville" trolley line.

Mr. McCarthy also said the Delaware River Bridge transit line proposal will be ready in detail for submission to the bridge commission by Dec. 1.

The banker indicated that the East Ridge Avenue trolley track removal proposal now pending in Council will precipitate a comprehensive discussion of city-P.R.T. relations. He said:

The city must take into consideration the fact that the P.R.T. is now paying \$184,000 annual rental to the Ridge Avenue Passenger Railway, one of the underliers, for the Ridge Avenue line. The line is a highly profitable one.

The city of Philadelphia has since agreed to permit the Philadelphia Rapid Transit to relay its tracks on Ridge Avenue east of Broad Street. The step marked abandonment, for the present, of plans to make the avenue a motor boulevard for traffic to and from the Delaware River Bridge. The agreement was made after P.R.T. directors suggested the matter be included as an issue in a future test case to condemn the underliers. This subject will be taken up, it was agreed, when P.R.T. opens negotiations early in 1932 for operation of the Ridge Avenue subway and other subway lines now under construction.

through the throwing of lighted cigarettes into rubbish cans and onto the railroad ties. During the last six months, the B.M.T. alone distributed 500,000 warnings to passengers observed smoking or carrying lighted butts on stairways, platforms, passageways or cars of the line.

Toledo, Ohio.—New fare boxes of the Woods closed type which takes in paper tickets, tokens and cash have been installed on the buses of the Community Traction Company to save the drivers annoyance in handling different types of collections. Magazines retain all the receipts, which are counted at the car-houses.

Seattle, Wash.—Publication of an official schedule of street car and bus routes of the Municipal Railway, with time-tables and other information of value to car riders, will be proposed to A. E. Pierce, acting superintendent, as a means of raising revenue for the system.

Birmingham, Ala.—Following the posting of a notice to the effect that 50 motormen and conductors, who have been working part time, would be laid off on Nov. 23, representatives of the union are arranging to confer with officials of the Birmingham Electric Company. The men involved in the proposed lay-off have been working under a "stagger" plan, whereby regular operators laid off two days out of every 21 days, and extra men laid off one day each week. Under the plan now proposed the payrolls would not be reduced since the working time of employees retained would be increased.

New York, N. Y.—The Board of Transportation, which is shortly to advertise the form of contract upon which bids will be sought for the operation of the Eighth Avenue subway, is expected to insist that the operator must be a New York corporation organized under the railroad law. Although the city built the new lines and will provide the necessary equipment to run them, the law does not release the operator from the obligation of providing at least \$10,000 capital for every mile operated. The new system, including the 4-mile link of the B. M. T.'s Culver line in Brooklyn, comprises about 60 route-miles.

Kansas City, Mo.—The Kansas City Public Service Company opened for business on Oct. 26 at its new quarters, the Kansas City Public Service Building, at Eighth and Delaware Streets. The building had been remodeled. Former quarters at Fifteenth Street and Grand Avenue were condemned by the city in connection with the Fifteenth Street widening project. Sixty thousand dollars was spent by the company in remodeling the present building, erected in 1887 by the Grand Avenue Cable Company.

Mason City, Iowa—On the occasion of Dollar Day here, the People's Gas & Electric Company did its share in making the event a success. Shoppers were permitted to ride free to shopping centers between 9 and 11 a.m. The offer of free street car service was widely advertised.

General

(Continued from Page 714)

Cleveland, Ohio—N. R. Howard, writing to the *New York Times* for Nov. 22, a long review of local political trends, said that "this week saw petitions put in circulation to enlist the candidacy of Peter Witt, whose position as an independent Democrat is somewhat comparable to Mr. Kohler's on the Republican side. Mr. Witt, now the transit consultant of the Van Sweringen interests, declares he will not run for Mayor, but there will be terrific pressure brought to bear on him."

Portland, Ore.—The Oregon Institute of Technology has established a course in repairing and servicing of buses and trucks. According to James B. Dinsdale, supervisor of the school, the course has been designed for mechanics desiring to specialize in heavy-duty equipment. E. L. Skinner, shop foreman of the Pacific Northwest Public Service Company, Portland, is instructor. Students spend a part of their time at the Center Street shops of the company studying methods used for servicing the buses. Actual work on buses and trucks is done in the local school.

Youngstown, Ohio—The post of City Street Railway Commissioner may be eliminated if Council fails to include in the 1932 appropriation provision for \$6,900 a year. Council meeting recently favored the move as an economy measure, and announcement has been made that in making up the new annual budget this salary item will be eliminated. No plan has yet been advanced for supervision of the local railway system under the terms of the Youngstown service-at-cost grant.

New York, N. Y.—Up to the present, the war against the subway smoker has made only slight headway, but the campaign against this particular form of human pest is on again in earnest under stimulus of the city's health department. The railroad companies, especially the Brooklyn-Manhattan Transit Corporation, have from time to time prosecuted educational campaigns, spreading appeal and warning through thousands of circulars and posters. The underground smoker, nevertheless, appears to have stood his ground, and at the height of the latest campaign in May of this year eighteen fires started in the B.M.T. subway lines in one 24-hour period

Special Fire Prevention Car a Sensation

It is estimated that 9,000 to 10,000 people were admitted to the car fitted up by the Harrisburg Railways, Harrisburg, Pa., to co-operate with the local fire department

of the first mortgage was necessary for reorganization of the company, but there would be no interruption of the company's bus service.

Under the original reorganization plans of the committee, the time limit for acceptance of the company's debentures had expired, but the Bondholders' Protective



Story of fire prevention spread by street car

in their educational work during Fire Prevention Week when the car was on exhibition. Very favorable comments were made in the local papers. With the assistance of the State fire marshall's department the railway was able to obtain a moving picture machine, an operator and several reels of pictures showing various movies of fire hazards. This apparatus was set up in the car, and with the use of black curtain material the interior of the car was darkened and service rendered over the entire system for the week, with stops at various locations at stated advertised times for the free display of these moving pictures. At various times the car was routed to several of the high schools in Harrisburg, and with the co-operation of the department of education the schools, by classes, were sent to attend this moving picture show.

Railway Recovers from Careless Truck Driver

According to the Lima *News* a verdict of \$200 has been returned in favor of the Western Ohio Railway & Power Company, by the jury hearing the case against C. J. Newton, Indiana truck driver, after 2½ hours of deliberation. A sum of \$790.91 had been asked by the plaintiff.

The case was filed by the railway as the result of a collision between a car, operated by the plaintiff, and a truck, owned by the defendant, in St. Marys, Ohio, on March 29, 1931.

The railway contended that the accident was due to negligence on the part of the truck driver. The allegations were denied by the defendant.

Receiver Named for New Haven & Shore Line

Frederick C. Spencer, of Guilford, was appointed temporary receiver of the New Haven & Shore Line Railway, New Haven, Conn., on Nov. 23. Holders of first mortgage bonds of the company made application through the Union & New Haven Trust Company, trustee, for his appointment, and the application was granted by Judge Patrick B. O'Sullivan of the Superior Court. Mr. Spencer said foreclosure

Committee of the company has instructed the trust company to accept debenture bonds of this railway until further notice. Bonds thus far received total \$390,700 in par value out of a total of \$460,000 originally issued. The company, once a rail-

way, now operates buses on its shore line. Under the leadership of Mr. Spencer and a new board of directors the company is consolidating and improving its financial position.

Electric and Bus Lines for Short Trips

In order to permit government officials and federal employees to use interurban electric railway lines and bus lines for short trips without going through the regular procedure involved in procuring transportation vouchers, the comptroller general has decided that standard regulations may be modified in such cases. Under the regular procedure government employees traveling on official business are required to obtain transportation requests which they exchange at ticket offices or travel bureaus for tickets. The comptroller general concedes, however, that for short trips over interurban lines or bus lines where the car or bus is boarded at points remote from ticket offices, it would be inconvenient for government people to comply with the rules. Henceforth, in such cases the payment of cash fares will be classified as emergency expenditures.

Maintenance Costs Reduced

(Continued from Page 715)

methods of lubricating the wire. C. O. Guernsey, J. G. Brill Company, stated that radio interference is less with trolley shoes, particularly on trolley bus lines.

On the subject of car lamps, Mr. Ward stated that the Third Avenue Railway has wired 103 cars for twenty lamps in series at a cost of \$42 per car. The system is so superior that he believes it should be installed on all new cars.

The Trend in Travelling is Towards the Trusty Tram

MANUFACTURERS of cigarettes are perturbed by the alarming increase in the habit of "rolling your own." The trend in coffin nails, in other words, is toward the bent and rusty variety. Instead of four trillion ready-made cigarettes being made in the year or the month, whatever is right, there are probably not more than three trillion nine hundred and ninety-nine billion.

All this points to the fact that it has become smart to be thrifty. The fellow who thought it *infra dig.* to mow his own front pasture, cheerfully gets up on Sunday morning before his golf game to do it.

In the same way, it is fashionable to travel by street car rather than "roll your own." Lots of the best people will be seen in the street cars every day. They are not ashamed to admit that it is a great deal cheaper and they have a use for the money they save.—"The Buzzer" of the British Columbia Electric Railway.

A spirited discussion took place on the subject of methods that can be adopted by the equipment department to increase riding, other than the routine work. Mr. Clark held that the major thing that can be done is to speed up the cars. From an entirely different angle, W. H. McCarty, Washington, believed that the men in the equipment department can make friends by getting them to join outside clubs and engage in civic activities. J. F. Craig, Westinghouse Electric & Manufacturing Company, thinks that all employees should ride the street cars and become familiar with the results of their work.

Mr. McCarty pointed out, on the subject of noise suppression, that the air compressor is a particularly bad offender, and that steps should be taken to quiet it. This can be done by placing it on a support of rubber. Wood blocks bolted to the wheels will quiet them to a marked degree. Trolley bases can be insulated with rubber, and rings can be welded on gears.

It was the opinion of the members that spun-steel wheels have given good results, and that they wear slightly less rapidly than rolled-steel wheels.

President Porter appointed a nominating committee composed of Messrs. McCarty, Kelly and Klein. They will report at the spring meeting. C. E. Keefer, superintendent of overhead and equipment Reading Traction Company, proposed Reading for the next meeting place. His offer was accepted, and the meeting dates were set for May 19 and 20.

In the afternoon the members were the guests of the York Railways. With E. L. Greene as host, they were taken in buses on an inspection trip to the repair shops.

FOREIGN NEWS

Consideration of London Transport Bill Postponed

By a special resolution agreed to by both Houses of Parliament, just before the dissolution early in October, the London Passenger Transport Bill was carried over to the new Parliament, to be taken up again at the point which it had reached in its Parliamentary career. Without such a resolution the bill would have died and the £40,000 spent by the Government in connection with its promotion would have been wasted. If the bill fails to pass into law, that charge will fall on the State, but if the bill passes, the transport board constituted by the bill will have to take on the liability.

CO-ORDINATION WAS PROPOSED

It may be recalled that early in the year the Labor Government introduced the bill, the main object of which is to consolidate and co-ordinate all forms of passenger transport within the London traffic area by means of a transport board which is to acquire and carry on all the local railway, tramway, and bus undertakings, with the exception of the suburban lines of the main line railways. The bill was referred to a joint committee of both Houses of Parliament, and that body decided the bill should be allowed to proceed. During those hearings, agreements were reached with the most important of the parties concerned. The one exception was the London County Council. The Council was finally satisfied as to the financial terms on which its tramway undertakings were to be taken over by the Transport Board, but it remained dissatisfied with the proposed constitution of that board. It regarded that body as not sufficiently amenable to public interest and too much a creature of the Ministry of Transport. Hence, on behalf of the London County Council, notice was given of amendments, to be moved when the bill came to the full committee stage in the House of Commons, to alter fundamentally the proposed constitution of the transport board by giving municipal interests a large representation on it.

LABOR GOVERNMENT REPLACED

Before it found time to proceed with the bill, the Labor Government was superseded and a National Government, composed of representatives of the three political parties, came into power with the sole object of meeting the national financial crisis then existing. Emergency legislation having been speedily passed, the National Government dissolved Parliament, and the general election in October followed. At the time of the meeting of the new Parliament in November, the London Passenger Transport Bill remained still to be dealt with.

In view of the overwhelming majority obtained by the National Government in the end of October, it is difficult to predict what disposition will be made of the London Transport Bill. The Prime Min-

ister seems to be favorably inclined towards it. On the other hand, it is a bill brought forward by the late Labor Government, and its chief sponsor, Mr. Morrison, then Minister of Transport, was defeated at the general election. So were nearly all Ministerial colleagues, and the great majority of the members of the new House of Commons, which is to begin its work on Nov. 10, are Conservatives.

Germ-Killer on English Street Car

Street car passengers in South Shields, England, this winter will have a better chance of fighting off colds and more serious winter ailments, if the new germ-destroying chemicals carried by a recently reconditioned car proves effective. According to a report from Consul William F. Doty, Newcastle-on-Tyne, made public by the Department of Commerce, an old car has been rebuilt and modernized with an installation of ventilators which change the air inside at three minute intervals. Since South Shields street cars are given names, the car replaced in service has been named "Monarch of Bermuda," no doubt as a compliment to the new luxury liner intended for use in the Furness Withy Service from New York to Bermuda.

Buses Superseding Tramcars

Announcements continue to be made in various places in England of the substitution of service by bus for tram service. The movement was at first confined to small tramway undertakings—some company-owned but many municipal—unable to maintain and renew tracks at costs greatly increased since the War. More recently the disposition toward substitution has become increasingly evident. In some cases large bus companies covering extensive areas have entered into running agreements with town councils under which the bus companies have taken over the service obligation of the tramways. In the great cities where tramway traffic is heavy and where track has been well maintained, the disposition toward substitution is not pronounced, but even there the bus is steadily growing in favor as an auxiliary to the tramways, buses being run on routes of light traffic, and also as extensions beyond suburban tramway terminals.

New Subway For Rome

Not long ago an edict was issued excluding street cars from the narrow and congested central area at Rome. Since that time, service between street cars on the outer circle and the center of the city has been maintained by single-deck buses. Now announcement is made that the technical committee of the Rome Metropolitan Railways will invite tenders for the construction of an underground railway to afford transport facilities for an anticipated city population of 2,000,000.

The present central station is to be demolished and rebuilt underground. Two additional underground stations are to be provided, the three being connected by

underground electric service. The scheme allows for the construction of six lines radiating from the central station and covering in all 35 miles. Three lines totaling 15 miles in length will be provided in the future; the others will be commenced forthwith, and of these the first will be 6½ miles in length and will cost approximately \$15,000,000. The entire project will require from twelve to fifteen years to complete.

London Subway Extension Makes Rapid Progress

Amazingly rapid progress has been made with the extension northwards of the Piccadilly Railway, one of the most important lines of the London Underground Railway system. The full length of the extension from Finsbury Park to Cockfosters is 7½ miles, and it is probable that the first part, from Finsbury Park to Arnos Grove, will be opened by Whitsuntide next year. The remainder, from Arnos Grove through Enfield West to Cockfosters, will be opened a few months later. For the first 4 miles the subway is built at deep level in twin tunnels. Work on this section was started about twelve months ago. A few years ago three years would have been regarded as a reasonable time for the tunneling already done, but operating from nine working sites, placed at intervals approximately one-half mile apart, Greathead shields have been boring steadily through the blue clay lying under London. From 10.30 Sunday night until 2.30 Saturday afternoon the work has proceeded continuously week after week. The heavy blue clay through which the tunnels have been bored has kept the shields to a steady pace, and the rate of progress, which has been more than 1 mile for several of the months, is claimed to have been the highest ever made in Europe.

Riga, Latvia—Following the unsuccessful efforts of the Belgium Concessionaires to renew a contract for the operation of the street railway lines here, the city government may take over the lines. Those in touch with the situation are led to believe that the city desires to purchase American equipment and to adopt certain American operating methods.

Paris, France—Plans were made some time ago to electrify the Paris-Lyons-Mediterranean Railroad, but the program must be carried out gradually owing to the cost. Shortly, however, the 84 miles between Culoz and Modane will be electrified. Power will be furnished by seven power stations driven by the Arly, the Doron, and the Beaufort Rivers. It is hoped gradually to electrify a number of lines in the southeast of France served by the P.L.M. The electrification of the Riviera line, with its many tunnels, will be especially welcome.

Hamilton, Bermuda—The new railway line from Hamilton to Somerset, about 9 miles, recently was placed in operation, and with the construction work on the remaining section of 12 miles to St. George well in hand, the completion of the work is assured within the period allowed by the authorizing

act. The railway will traverse the length of the island, and the system will be operated by petrol-driven rolling stock. The cars follow the European custom of dividing the travel coaches into first and second-class compartments. Since its discovery in the sixteenth century, Bermuda has been dependent almost entirely upon horse-drawn vehicles, augmented in later years by the bicycle as a means of transportation.

Warsaw, Poland—A scheme drawn up by M. Joseph Lenartowicz, the chief engineer of the municipal tramways here, for the construction of a system of underground and overhead electric railways is at present under consideration by the Municipal Council. The projected lines would embrace 16½ miles of underground and 12½ miles of overhead lines.

Kirkcaldy, Scotland.—The Town Council has operated the tramways in the burgh for many years, but not with much financial success. Now it has accepted an offer from a bus company for a monopoly of passenger transport rights in the town. The company will make a cash payment of £27,000 and an annual payment of £2,000 during a 21-year lease. The tramways will be discontinued.

Kiev, Russia—The foundation was laid recently for a new surface car building plant near the Dombal shop in Kiev. The new plant will be equipped with machinery of the most modern type. Its daily capacity will be six cars.

Derby, England—In connection with the proposed conversion of the Derby tramways to the trolley bus system, the Tramways Committee has decided that the new vehicles shall be fitted throughout with safety glass at an extra cost of £40 per vehicle.

Rosario, Argentine—This city reports an arrangement between its street railway company and provincial authorities whereby service will not be suspended as threatened. The province has agreed to abolish all bus service on routes over which street cars are run, and to permit an increase in fare from 10 to 15 cents on Sundays.

Huddersfield, England—The development of the tram car in England, from the point of view of the passenger, proceeds apace. A prominent example is afforded by the Huddersfield Corporation, which has built six double-deck cars at a cost of £2,486 each. Fitted with 50-hp. motors, the cars are capable of a speed of 40 m.p.h. The cars have luxuriously upholstered seats. Concealed electric lamps give a soft light.

London, England—A bill jointly promoted by the London Electric, the Metropolitan District, and the Central London Railways has been passed by Parliament, one of the objects of which is to extend the Baker Street & Waterloo Railway for 1½ miles to a point in South London called Camberwell Green. Other objects are to reconstruct and improve a number of existing stations on the railways. Part of the cost is to be met out of capital authorized in 1930, but is proposed to raise £1,500,000.

Leningrad, Russia—The Soviet engineer, F. P. Kazantsev, has turned over gratis to the Transport Institute for Inventions and Improvements his invention of an electro-pneumatic brake. It is claimed that this brake assures complete safety of passenger trains, regardless of the speed at which they are running.

trifles inevitably destroys efficiency. Subordinates who have ideas in their heads shut up like claims, they lose initiative and vigor, and if such a policy is continued, many of them become fawning, bootlicking toadies and hypocrites.

The way to get loyalty and service is to pick men with great care. Have all your doubts and misgivings before and not after you give them responsible posts. If you cannot erase your doubts, then it is unwise to take that particular man, but once the man is selected, tell him what you want clearly and frankly. Keep nothing in reserve. Let him have your whole mind. Then give him enough rope to do the job.

In conclusion Mr. McAdoo says:

Defeat, when it has come my way, has never left me sour or disappointed; and I can say with sincerity that through good luck or bad, fair weather or foul, success or failure, cynicism has not conquered me nor has my faith in humanity been impaired. My life has covered a wide range and it has been full of interesting and unexpected adventure. I have no quarrel with Fate, no matter in what moods I have found her, and no matter what her decrees have been. I have had a glorious time.

All of which is a conclusion inescapable to the reader of "Crowded Years."

BOOK REVIEWS

Crowded Years

"The Reminiscences of William G. McAdoo," published by Houghton, Mifflin Company, Boston, Mass.; 542 pages. Price \$5.

"Crowded Years" is an arresting title. So is the book. Naturally the chief appeal of these reminiscences among men in the utility field may be expected to be Mr. McAdoo's early work in the electrification of the street railway lines in Knoxville, his part in promoting and operating the tunnels of the Hudson & Manhattan Railroad under the Hudson River and his treatment of the administration of the railroads under government auspices; but the book is the story of the work of a great executive in many lines of endeavor carried out under the most trying circumstances.

To attempt to review the contents of "Crowded Years" is out of the question in a summary such as this. Only a hint can be given here and there. For instance in the chapter "An Adventure in Electricity," Mr. McAdoo, in discussing the pioneer work in electrifying the railway at Knoxville, says that his preference for tangibles had its drawbacks, for tangible realities sometimes possess the characteristics of enraged bulls. "Once brought into being," he says, "they often have such a ferocious aspect that one can only cling to the tail and pray for help." This, indeed, is a chapter that the older men in this industry will appreciate, while to the younger men it will unfold the drama of the adventurers who made possible the industry of which they are now a part.

Similarly the chapter "Burrowing Under the Hudson River" is the story of an obsession that would not be denied. For eleven years, Mr. McAdoo was president of the tunnel companies. He says that the millions he was supposed to have made out of this enterprise are mythical millions. He does not set down the facts by way of complaint, but merely as items of history. And what items they are! As Mr. McAdoo so aptly says: "Business sense is the capacity to manage a business in an orderly and profitable manner, while money-making is the expression of the acquisitive sense." And Mr. McAdoo left this industry a rich legacy in his policy "The Public Be Pleased." He was one of the first and one of the best public relations men the industry has ever had.

Again in the chapters "The Plight of the Railroads," "Director-General of Railroads" and "Raising Wages on the Railroads," Mr. McAdoo has set down facts that needed to be set down.

It would, indeed, be surprising if a man with the wealth of contacts the author had and the myriad of experiences did not generalize now and then. Mr. McAdoo does. For instance, in "Ideas That Became Realities," he says:

A small-minded, carping executive who goes about rasping and fault-finding over

For Corporate Workers

"Formal Corporate Practice, Working Methods and Systems," by William H. Crow, A. B., LL.B. Published by Burrell-Snow, Inc., New York; 1,530 pages. Price, \$10.

Corporation officials everywhere should welcome this work by Mr. Crow. It is not enough that it should find a place in the library of corporations for ready reference, but the executive everywhere down the line concerned with corporate procedure should have it as part of his own personal equipment, no matter how well schooled he may be. Designed to be a working tool and guide for all persons concerned with, or called upon to participate in, the formal activities of the corporation, it relates to those affairs of the corporation that are shaped and influenced by its character as a creature of the law. The text largely excludes those divisions of corporate activities relating to corporation accounting and corporation finance, as each of these branches requires a comprehensive treatment in itself.

Reviewers take publishers pronouncements *cum grano salis*. Not that publishers are not sincere about what they believe about the works for which they stand sponsor, but reviewers come to know that often there is a wide gulf between promise and performance. In Mr. Crow's work promise and performance do not part company. The publisher states the matter concisely and correctly when he says that the treatise describes the work of each of the corporate officers, shows the interrelation of offices, and reveals how chief executives of national reputation maintain control over the work of their subordinates.

On the other hand, the author is fully justified in saying that although the book was constructed to fill the function of a reference book, wherefrom experienced officers or attorneys could quickly refer to a discussion or precedent bearing upon the problem of the instant, the effort was to develop the progressive topics in as plain and untechnical a manner as possible. In short, the work affords a medium, hitherto unavailable in the field, in anything like comparable form, for the education of aspirants to corporate offices.

PERSONAL MENTION

Senator's Son Heads Detroit Council

A new political star is being hailed in Detroit as a result of the election of 29-year-old Frank Couzens, son of Senator James Couzens, as president of the City Council.

The huge vote which young Couzens piled up at the election on Nov. 3 to outdistance all his rivals for a seat in the nine-man Council overshadowed even the re-election of Mayor Frank Murphy, who easily defeated Harold H. Emmons. By the provisions of the city charter, the high man becomes president of the Council.

Frank Couzens has served as member of the Planning Commission and the Street Railway Commission. On Nov. 3 he sought his first elective office. As the *Consolidated Press* sees it, the election of Mr. Couzens and Mr. Murphy on the same day gives to the Detroit political picture a May-time tone. Mr. Murphy is still in his thirties, Mr. Couzens in his twenties. Mr. Couzens, as president of the Council, will be acting Mayor during Mr. Murphy's absence, although he is under the age requirement for Mayor.

As noted in ELECTRIC RAILWAY JOURNAL News for Nov. 7, page 222, the amendment to the Detroit city charter providing that the proceeds from the sale of public utility bonds can be used for the improvement, extension, reconstruction and replacement, or the preservation of the Detroit Municipal Railway was carried at the election on Nov. 3.

O. H. Hansen in Accounting Post With Indiana Railroad

O. H. Hansen, auditor of passenger revenue for the Chicago, South Shore & South Bend Railroad, has been made auditor of passenger revenue for the Indiana Railroad, with his offices in Indianapolis.

Mr. Hansen will be succeeded in the Michigan City offices of the South Shore line by Eric M. Dickson, who came to the South Shore line from Chicago last August. Mr. Dickson was previously connected with the Metropolitan Motor Coach Company.

In his new position Mr. Hansen will supervise passenger accounts for the Indiana Railroad, an extensive system which operates throughout the central and southern part of the State. He has just completed 21 years of service with the South Shore line. He was successively cashier, paymaster and supervisor of passenger revenues during his connection with the railroad.

Westinghouse Advertising Manager

Ralph Leavenworth has been appointed general advertising manager of the Westinghouse Electric & Manufacturing Company. He will have charge of all advertising and publicity activities of the

company including the advertising division of the merchandising department, now centered in Mansfield, Ohio.

Graduating from Hamilton College, Clinton, N. Y., in 1914, he served with the Y.M.C.A. at Cleveland for four years. After the War he joined the Standard Parts Company, also located in Cleveland, and except for a short period, during which he served as personnel director for a publishing firm, he was advertising manager of this concern, until 1923. In that year he became an account executive for Paul Teas, Inc., an industrial advertising agency. He remained with this firm six years, becoming part owner of the company.

On Jan. 1, 1930, he joined the Austin Company, Cleveland, construction engineers, as assistant general sales manager, serving in an executive capacity on sales, administrative and advertising work concerned with this international organization.

J. C. MacKeen Heads Nova Scotia Company

John C. MacKeen has been elected president of the Nova Scotia Light & Power Company, operating the electric railway in Halifax. He is only 33 years old, being the youngest son of the late David MacKeen, president from 1895 to 1912 of the Halifax Electric Tramways, predecessor of the Nova Scotia Light & Power Company.

J. C. MacKeen was educated at Halifax and at the Royal Military College, Kingston, Ont. In 1926 he became a director of the Nova Scotia Light & Power Company. As president, he succeeds W. H. Covert, recently sworn in as Lieutenant Governor of Nova Scotia. Mr. Covert succeeded as Lieutenant Governor Frank Stanfield, who died recently. Succeeding Mr. Stanfield as a director of the power company is R. J. Macadam, Halifax. Following Mr. MacKeen as vice-president of the company is J. McG. Stewart, Halifax, who has been a director since 1926.

Mr. MacKeen is vice-president of the Royal Securities Corporation, and has been manager of the Halifax branch of that firm since 1925. The case of the Messrs. MacKeens, father and son, is believed to be the only instance in which father and son have served in the presidency of any Canadian electric railway.

Lord Ashfield Named to Canadian Board

Lord Ashfield has accepted Premier Bennett's invitation to head the commission which is to investigate transportation conditions in Canada. Heavy deficits on the Canadian National and serious declines in Canadian Pacific revenues have prompted the inquiry, which, it is hoped, will solve Canada's transportation difficulties. Since 1928 the railways' position has depreciated, partly from freight-rate reductions, partly from motor car and bus competition, but mostly from the depression.

The appointment has met with general public accord in Canada, but, as the Montreal *Gazette* sees it, further discussion of the commission's task must be more or less speculative until the commission itself has been formally constituted and the scope of the inquiry defined.

The choice of Lord Ashfield is accepted as particularly commendable in view of the outstanding position which Lord Ashfield, a former president of the Board of Trade, occupies in the British transportation field, and of the very wide experience which he has had. He is chairman of the London Underground Railways and has directed the operation of other electrical services, including surface lines, notably in the United States.

In Great Britain Lord Ashfield, or Albert H. Stanley, as he was known when he served in the United States, has been connected actively with the administration of surface and underground transportation for many years, and he has extensive interests in motor transport and bus services. His practical knowledge, therefore, has been gained on both sides of the Atlantic, and in divisions of the transportation field which, as the *Gazette* said, are certain to engage much study on the part of the commission over whose inquiries he will preside.

F. P. Gruenberg on Pennsylvania Commission

A vacancy in the membership of the State Public Service Commission of Pennsylvania has been filled by Governor Pinchot in the appointment of Frederick P. Gruenberg, of Philadelphia.

Mr. Gruenberg was at one time a department head in the long-established banking firm of Brown Brothers & Company, and latterly was treasurer of the Bankers Securities Corporation of Philadelphia.

For years he was director of the Bureau of Municipal Research, Philadelphia. At one time he was chairman of the Governmental Research Conference, United States and Canada. He was formerly a member of the council of American Political Science Association and has written and lectured widely on civic and economic subjects.

During the legislative sessions of 1917 and 1919 Mr. Gruenberg served on the Citizens' Committee which secured the new charter for Philadelphia. He was secretary of the committee during the 1917 session.

When Governor Sproul appointed a commission to consider a new Constitution in 1920, Mr. Gruenberg worked with a number of the subcommittees in drafting measures and in technical studies on various aspects of their work, particularly affecting public finance and administration.

Edward de Harne, superintendent of way and structures of the Honolulu Rapid Transit Company, returned to the Hawaiian Islands on Nov. 1 after a two-month tour of the United States in the interests of his company. Mr. de Harne visited all of the major electric railway properties in the country.

E. O. Howard, president of the Walker Bank & Trust Company and president of the Utah Light & Traction Company, Salt Lake City, has been appointed chairman of the Salt Lake City unit of the National Credit Corporation, President Hoover's \$500,000,000 credit bank. Mr. Howard will have charge of Utah, southern Idaho and eastern Nevada. He is well known in Western financial circles, having been connected with the Walker Bank & Trust Company for many years. In addition to being head of that organization and president of the Utah Light & Traction Company, he is a member of the board of directors of the Salt Lake branch of the Federal Reserve Bank of San Francisco, a director of the Home Fire Insurance Company, the Utah-Idaho Sugar Company, American Packing Company, M. H. Walker Realty Company, and the Strevell-Paterson Hardware Company.

William W. Cloud, president and general manager of the Yellow Cab Company, Baltimore, Md., and president of the National Association of Taxicab Owners, has been appointed chairman of the Committee on Administration of the Convention and Visitors Bureau of the Baltimore Association of Commerce. Mr. Cloud has been prominently identified with the work of the association for a number of years.

Walter J. Cummings has accepted an appointment to the administrative council of Loyola University. Mr. Cummings is president of the Chicago & West Towns Railway, the Calumet & Chicago District Transit Company, the Cummings Car & Coach Company, chairman of the board of the Des Moines Railway and director and vice-president of the J. G. Brill Company. Members of the administrative council of the University include Samuel Insull, Jr., Edward A. Cudahy, Jr., Charles F. Clarke, Mathew J. Hickey, Edward J. Mehren, Stuyvesant Peabody, Martin J. Quigley, David F. Bremner, Lawrence A. Downs and Mr. Cummings.

G. H. Harries, major-general U.S.A. (retired), formerly vice-president for H. M. Byllesby & Company, Chicago, Ill., and for nearly 40 years representative of investors, operators, estimators and consumers of electric energy throughout the country, has retired from the active engineering field. At various consecutive periods, General Harries has been treasurer of the National Electric Light Association, and president of the Association of Edison Illuminating Companies, the American Electric Railway Association and the Illumination Engineering Association. He will live at Los Angeles, Cal.

A. C. Spurr, former general manager of the Wheeling Traction Company, Wheeling, W. Va., who has assumed new duties in the general offices of the Monongahela-West Penn Public Service Company at Pittsburgh, was surprised in the Chamber of Commerce Assembly room of the Market Auditorium recently. Employees of the Wheeling Traction

Company and their families were joint sponsors of the testimonial party for their former chief, and as a token of their esteem presented him a gold watch, chain and penknife set.

Dr. H. C. Parmelee Vice-President of McGraw-Hill

Dr. H. C. Parmelee has been elected a vice-president of the McGraw-Hill Publishing Company, Inc., publisher of *Electric Railway Journal*, as a natural sequence to the splendid work that he has done since his appointment as editorial director in 1929.



Blank & Staller
Dr. H. C. Parmelee

Dr. Parmelee has a background that covers the presidency of the Colorado School of Mines and some twenty years' experience in important editorial capacities in the McGraw-Hill Publishing Company. Through his able editorship of *Chemical and Metallurgical Engineering*, and as editorial director of the company, Dr. Parmelee has demonstrated amply his ability to be the guiding head of the company's editorial activities.

Dr. Parmelee was born in Omaha, Neb., on Dec. 4, 1874. He was educated in Omaha public schools and later in the University of Nebraska. At the latter institution he pursued the chemical-physical group of studies, receiving the degree of B.S. in 1897, and A.M. in 1899. He was undergraduate assistant in chemistry at the university for one year and graduate instructor for two years.

Several years of commercial laboratory work followed his service as teacher, first as assistant chemist for the Union Pacific Railroad, and later as chief chemist for the Globe plant of the American Smelting & Refining Company. Three years were spent as a consulting chemist in Denver after which he entered editorial work, first as editor of *Mining Reporter*, Denver, and successively as editor of the *Western Chemist and Metallurgist*, Western editor of *Chemical and Metallurgical Engineering* and finally editor of that publication.

The years spent in editorial work were consecutive except for an interim of one year, 1916-1917 during which he was pres-

ident of the Colorado School of Mines. For several years prior to that he had been a trustee of the Colorado School of Mines. At the close of his presidency the honorary degree of D.S. of Colorado College, Colorado Springs, was conferred upon him.

Dr. Parmelee is a member of the following scientific and engineering societies: American Chemical Society, American Electrochemical Society, Société de Chimie Industrielle, American Institute of Chemical Engineers, Teknik Club, Denver. He is also a member of the Chemists' Club and Engineers' Club, New York.

Ernest M. Massey, since March 25, 1921, assistant secretary of the Market Street Railway, San Francisco, Cal., has been elected secretary of the company to fill the vacancy left by the late George B. Willcutt, vice-president and secretary, who died on Sept. 17. Mr. Massey entered the employ of the United Railroads, the predecessor of the Market Street Railway, on April 1, 1913, as a clerk in the secretary's office. He held that position until he was made assistant secretary in 1921.

Miss Mary McDonough, employed in the street railway system at Seattle, Wash., under private management under the Puget Sound Light & Power Company and its predecessors, including the Seattle Electric Company, and under public ownership, for more than twenty years, has been appointed secretary-stenographer to the Street Railway Commission in that city.

George H. Engels, since 1921 chief accountant for the Market Street Railway, San Francisco, Cal., has been appointed general auditor of that company. The appointment became effective on Nov. 10.

T. J. Day, freight traffic manager of the Pacific Electric Railway in Southern California, has been elected president of the Los Angeles Transportation Club for the ensuing year. He succeeds S. J. Carter of the Pennzoil Company. With his broad experience in railroad work Mr. Day is ideally fitted to carry on the comprehensive program planned by the Transportation Club, the membership of which is made up of persons engaged in electric railway, steam railroad and steamship work. D. W. Pontius, president of the Pacific Electric Railway, acted as master of ceremonies on the occasion of the club's annual dinner dance on Nov. 13 at which Mr. Day was installed.

Aldon J. Anderson, traffic manager of the Salt Lake & Utah Railroad, Salt Lake City, Utah, has been elected as a member of the executive board of the American Short Line Railroad Association for the Pacific region. The election was held at a recent meeting of the association in Louisville. The association is composed of 395 member lines in the United States. The Pacific region embraces Utah, Montana, Wyoming, Colorado, Arizona, Nevada, Washington, Oregon and California.

OBITUARY

Edward E. Gold

Edward E. Gold, inventor of the car heating system now in use on many railroads in the United States, Canada and Europe, died on Oct. 29 of a heart attack. He had been ill only 24 hours, and three days before had visited the offices of the Gold Car Heating & Lighting Company, Brooklyn, of which he was chairman of the board. His age was 84.

Mr. Gold was born in Waverly, Ill. As a boy he attended The Gunnery, a private school in Washington, Conn. At the age of eighteen, he went to New York and entered the employ of the Scoville Manufacturing Company.

In 1882 he invented a system for heating railroad cars with steam from the locomotive by means of a steam hose coupler. It did away with coal stoves, practically eliminating the danger of fire in the event of a train wreck. Mr. Gold obtained more than 100 American and foreign patents. He also developed an electric heater for railroad use.

Soon after inventing his steam heating system, Mr. Gold organized the Gold Car Heating Company. The rapidity with which the business grew caused a reorganization in 1903 as the Gold Car Heating & Lighting Company. Mr. Gold was president until three years ago, when he resigned to become chairman of the board. Despite his advanced years, he maintained an active interest in the business until his death.

E. P. Sommers

Edgar P. Sommers, former secretary-treasurer of the St. Louis & Suburban Railway, now included in the system of the St. Louis Public Service Company, St. Louis, Mo., died there recently. Mr. Sommers was born in St. Louis on Jan. 21, 1870. He was educated in the public schools of Kirkwood, Mo., and at Knox College, Galesburg, Ill. He began his business career as a clerk in a mercantile establishment and later became auditor for the National Candy Company. His service with the St. Louis & Suburban Railway began in 1899. He was made secretary-treasurer in October, 1902. In the Spanish-American War he served as a second lieutenant for Company D, First Regiment for Volunteer Infantry, later being made captain. He was a member of the Military Order of Foreign Wars, the Military and Naval Order of the Spanish-American War and the United Spanish War Veterans.

H. A. Carson

Howard A. Carson, famous subway engineer and chief engineer of the Boston Transit Commission for many years died on Oct. 26 at his home in Malden, Mass., aged 88. He was graduated from the Massachusetts Institute of Technology in 1869. After serving as assistant engineer of the water works at Providence, R. I., Mr. Carson became superintendent of construction of the Boston Transit System in 1878. He was named chief engineer in

1894, and continued there until 1909. During that time he supervised the construction of the Boston subway, the East Boston and the Washington Street tunnels. His excellent record in this line of underground construction caused him to be consulted in the building of the New York subway and the two-track tunnel under the Detroit River at Detroit, Mich.

H. B. Flowers

Herbert Baker Flowers, former president of the New Orleans Public Service, Inc., and previously vice-president and general manager of the United Railways & Electric Company, Baltimore, Md., died in Baltimore on Nov. 24 from pistol wounds self inflicted. Friends and associates were unable to ascribe a tangible reason for Mr. Flowers' act, other than that he had brooded over the death of a friend, although there had been no outward indication that this bereavement and the further



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H. B. Flowers

one of the death some time ago of Mrs. Flowers had served to depress him to the point of despondency.

Mr. Flowers became general manager of the company in Baltimore in 1919, when he was promoted from assistant general manager to succeed James R. Pratt, who was made vice-president and placed at the head of the claims department.

He was graduated from the law school of the University of Michigan in 1903 and from the engineering school of that university in 1905. He went into the operating department of the Detroit United Railway, taking a position in the office of Lord Stanley, the general superintendent, now head of the London Underground Railways.

Eighteen years ago Mr. Flowers went to Baltimore to take a position with the United as assistant superintendent of transportation. In 1917 he became assistant general manager.

He went to New Orleans early in 1923, then to take charge of the local company, then it is formative stages under new ownership. In that city he carried on intensively as executive head of a property which included not only the transportation service, but light and power and gas as well. He retired from the company at New Orleans more than a year ago, but

not until the matters of supplying New Orleans with natural gas and the issues growing out of the precipitate strike of the transportation employees there had been met and solved. His unusual schooling in both the law and in engineering enabled him to bring this combination of knowledge to bear on the problems before him not only in his corporate work but in the wider field of activities of the national associations, notably in American Electric Railway Association affairs having to do with the one-man car, traffic signals and trackless transportation.

Seymour Mandelbaum, 81 years of age, for many years one of the leading business men of Baltimore and a director of the United Railways & Electric Company, Baltimore, died at his suite in the Belvedere Hotel on Nov. 1.

Nathaniel Curry, Amherst, N. S., first president of the Canadian Car Company, and a director of the Montreal Tramways, died at Tidnish, N. S., following a heart attack. Since 1912 he had been a member of the Canadian Senate. He was made president of the Canadian Car Company in 1909, but more recently had been chairman of the board. He was 80 years old.

Frank Stanfield, aged 60, lieutenant governor of Nova Scotia, and thrice elected to the Nova Scotia Legislature, is dead. Mr. Stanfield was a director of the Nova Scotia Light & Power Company, operating the electric railway in Halifax.

Robert Lund Horsfield, general manager and engineer of Leeds (England) Corporation Tramways and Motors, is dead. He had been manager since 1928. He had a varied career in tramway work, both with companies and with municipalities. As an expert he was often called on for advice, and for many years he was a member of the executive council of the Municipal Tramways & Transport Association. Of that body he was president in 1926-7.

Patrick O'Marie, a division superintendent of the Market Street Railway, San Francisco, Cal., by which he had been employed 33 years, is dead, following injuries received in an accident in his own home when he tripped and fell downstairs.

Henry V. Neal, 83 years old, died at his home in Everett, Mass., recently. For many years he was with the Boston Elevated Railway. He is survived by a son, J. Henry Neal, also long an officer of the railway.

Prof. Henry M. Tyler, professor emeritus of Greek at Smith College and for many years president of the Northampton Street Railway, Northampton, Mass., died at his home in Northampton on Nov. 3, at the age of 88 years.

Edward A. Young, treasurer of the Clinton Street Railway, Clinton, Iowa, died on Nov. 12 after an illness of nearly a year. Mr. Young was prominent as an executive in banking, newspaper and lumber industries, and was well known in fraternal and club activities.

INDUSTRY MARKET AND TRADE NEWS

Capital Traction Company to Buy 35 New Cars

An expenditure of nearly \$700,000 by the Capital Traction Company to purchase 35 new cars is involved in the negotiations which that company announced recently. Purchase of the 35 cars to replace old equipment was authorized by the board of directors at its meeting last May. The company is now in a position, it was said, to sign contracts for this new equipment within a short time. Delivery is to be made as soon as possible and the appearance of the cars on Washington streets is expected probably in February.

The new cars, fully equipped, will cost about \$700,000 and company officials indicated that if they prove attractive to the riding public further plans for the replacement of its old cars with new ones will be carried out in the next few years.

The 35 new cars will have four motors each, will weigh about 31,000 lb., or 10,000 lb. less than the old cars.

Electro-Pneumatic Control Subway Cars

Electro-pneumatic control equipment costing \$1,230,000 has been ordered by the Board of Transportation of New York City from the Westinghouse Electric & Manufacturing Company. This control apparatus will be used on the 500 new subway cars for the city's rapid transit system.

The electro-pneumatic control permits the operation of trains made up of eleven subway cars. It provides full automatic acceleration and maintains the same accelerating and braking rates regardless of the loading of the car. The control equipments for the 500 cars just ordered are duplicates of those on the 300 cars that were purchased two years ago by New York City for its Eighth Avenue Subway.

New Southern Representative for Cleveland Pneumatic Tool

F. H. Burr, director of the automotive division of the Cleveland Pneumatic Tool Company, manufacturers of Cleco Air Springs for trucks and buses, and all kinds of air-operated tools, appliances and accessories, has announced the appointment of the Harris Rim & Wheel Company, of Atlanta, Ga., as distributor for air springs in that State.

John A. Harris, head of the company, has been in the rim and wheel business since 1918. Until 1928 his works were in Philadelphia. He then opened a shop in Atlanta as direct factory representative for various rim and wheel manufacturers.

Along with merchandising through dealers and jobbers in Georgia and parts of five other States, the Harris Rim & Wheel Company maintains complete shop service. It has close contact with bus and truck operators. In addition to Mr. Harris, his force includes among

others two salesmen and three experienced shop men. In addition to the Cleveland Pneumatic Tool Company, Mr. Harris represents thirteen other concerns providing automotive equipment.

No Change in Tire Prices

Leading tire manufacturers are entering the spring-dating period for tire sales with no change in prices on any of the various lines manufactured. Companies which have made no changes include the Good-year Tire & Rubber Company, Firestone Tire & Rubber Company, the B. F. Goodrich Company, and General Tire & Rubber Company.

The spring-dating period extends from Nov. 15 to May 15, and is the period within which dealers lay in stocks for spring business. The prices made at the beginning of that period are guaranteed to dealers against decline, meaning that if lower prices are later affected in the period dealers are rebated on tires bought at previous price.

Bus Deliveries

Alexandria, Barcroft & Washington Rapid Transit Company, Alexandria, Va., two Yellow Coach, 29-passenger, city type.

Baltimore Coach Company, Baltimore, Md., 22 Mack, 33-passenger, Model BK.

Boston Elevated Railway, Boston, Mass., one Mack, 44-passenger, Model BT; and five A.C.F., metropolitan type.

Brooklyn Bus Corporation, Brooklyn, N. Y., one Mack, 44-passenger, Model BT; and 24 Twin Coach, Model 30.

Department of Street Railways, City of Detroit, Mich., five A.C.F., 33-passenger, street car type.

Duluth Street Railway, Duluth, Minn., two Twin Coach, Model 20.

Duluth Superior Coach Company, Superior, Wis., one Yellow Coach, 21-passenger, city type.

Key System Transit Company, Oakland, Cal., one Twin Coach, Model 15.

Lehigh Valley Transit Company, Allentown, Pa., three Mack, 37-passenger, Model BK.

Middlesex & Boston Street Railway, Newtonville, Mass., one White, Model 65A.

Springfield Street Railway, Springfield, Mass., four Yellow Coach, 38-passenger, city type.

Syracuse & Eastern Railroad, Syracuse, N. Y., five White, Model 65A.

Third Avenue Railway, New York, N. Y., one White, Model 54A.

Virginia Electric & Power Company, Norfolk, Va., four Mack, 22-passenger, Model BG.

West Ridge Transportation Company, Girard, Pa., two Yellow Coach, 21-passenger, city type.

F. J. & G. Orders Five High-Speed Interurban Cars

Five streamlined cars, similar to the cars recently placed in service by the Philadelphia & Western Railway, have been ordered by the Fonda, Johnstown & Gloversville Railroad from the J. G. Brill Company for delivery in the latter part of December. These cars will be used on the double-track interurban line between Gloversville and Schenectady, N. Y. The new cars will be single-end double-truck, one-man operated and will seat 48 passengers.

The Interstate Commerce Commission has been asked to approve issuance of notes aggregating \$75,000 to be secured by an equipment lease warrant on the cars. The company will pay \$25,000 out of cash.

Detailed specifications of the cars follow:

Type of unit	One-man, motor, passenger, interurban
Weights: Car body	single end, double truck
Truck a.	17,000 lb.
Total.	14,200 lb.
Boleter centers	41,800 lb.
Length over all	25 ft.
Truck wheelbase	46 ft. 11 in.
Width over all	6 ft.
Height, rail to trolley base	9 ft. 2 1/2 in.
Window post apacing	10 ft. 9 1/2 in.
Body	33 in.
Roof	Aluminum
Doors	Arch
Air brakea.	End folding
Armature bearings	General Electric
Axes	Plain
Car signal system	Annealed steel
Compressors	Elec. Service Supplies Co.
Conduit	General Electric, CP-127B
Control	Duraduct
Couplers	General Electric, type K
Curtain fixtures	Portable bar
Curtain material	Adams & Wetlak
Destination signs	Pantastote
Door mechanism	Elec. Service Supplies Co.
Fara boxes	National Pneumatic Co.
Finish	National Cash Register
Floor covering	Du Lux
Gears and pinions	Linoleum, Armstrong Cork Co.
Glass	General Electric, heat-treated
Hand brakes	Non-shatterable, Libby-Owens (o.)
Hand straps	Peacock stafaffles
Heat insulating material	Stainless steel tubing
Heaters	Compressed cork, Armstrong Cork Co.
Headlights	Consolidated Car Heating Co.
Headlining	Elec. Service Supplies Co.
Interior trim	Aluminum
Journal bearings	Chromium plated
Journal boxes	Plain
Lamp fixtures	Semi-steel, J. G. Brill
Motors	Elec. Service Supplies Co.
Roof material	Four GE-301, inside hung
Safety car devices	Oregon fir
Sash fixtures	Dead man control
Seata	Stainless steel, O. M. Edwards
Seat apacing	J. G. Brill, No. 308
Seating material	33 in.
Slack adjusters	Leather
Step treads	J. G. Brill, mechanical
Trolley retrievers	Wood & Kasa, atrips
Trolley base	Ohio Brass Co.
Trolley wheela	General Electric Co.
Trucks	General Electric Co.
Ventilatora	J. G. Brill, 89-E-1
Wheels	J. G. Brill, forced draft

Seven Trolley Buses for Fitchburg

The Fitchburg & Leominster Street Railway, Fitchburg, Mass., has ordered seven buses, each seating 40 passengers, from the J. G. Brill Company for delivery shortly after Jan. 1. The trolley buses will be substituted for all the electric car operation, amounting to 12 miles of double line. The General Electric Company will supply the motors and control for the vehicles. The overhead material will be purchased from the Ohio Brass Company at a cost of \$35,000.

Trade Notes

National Pneumatic Company was awarded the order for pneumatically operated folding doors for the 22 trolley buses to be built for Kenosha, Wis., by General Motors and the St. Louis Car Company.

J. G. Brill Company has received an order for four 30-passenger trolley buses from the Kansas Power & Light Company, Topeka, Kan.

A. M. Byers Company announces the appointment of W. J. Wignall, formerly vice-president of the Locomotive Terminal Improvement Company, as director of railroad sales with headquarters in Pittsburgh.

Ohmer Register Company, a wholly owned subsidiary of the Ohmer Fare Register Company, was incorporated under the laws of the State of Ohio on Oct. 24, 1931. The Ohmer Register Company will act as the sales agent for the products manufactured by the parent Company.

H. W. Kilkenny has resigned as St. Louis branch office manager of the Ohio Brass Company. Mr. Kilkenny, who has been actively identified with the electrical industry since 1907, is financially interested in his brother's company, the J. G. Kilkenny Company, manufacturers' agents, of Cleveland, Ohio.

F. A. Keihns has been appointed sales engineer of the J. G. Brill Company, Philadelphia, Pa. While Mr. Keihns has been sales engineer of the automotive car division, since 1924, he will now be in charge of all sales engineering matters, reporting to Charles O. Guernsey, whose appointment as chief engineer in charge of all Brill engineering activities was announced in ELECTRIC RAILWAY JOURNAL for October.

General Car & Coach to Dissolve

Edward J. Trimbley has been appointed temporary receiver of all the property of the General Car & Coach Company by Justice Rogers of the Supreme Court to administer the affairs of the company. Creditors are restrained from beginning any action against the company for recovery. The proceeding is entitled "in the matter of the application of a majority of the directors of the General Car & Coach Company for voluntary dissolution." The court has ordered all persons interested to show cause before J. Edward Singleton, appointed referee for the purpose, why the corporation should not be dissolved. The hearing date has been set for Dec. 21 at the office of the referee in Glens Falls, N. Y.

Conspectus of Indexes for November, 1931

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by ALBERT S. RICHIEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares*	Nov., 1931 1913 = 4.84	Oct., 1931 7.85	Nov., 1930 7.76	Nov., 1931 7.85	Jan., 1927 7.38
Electric Railway Materials*	Nov., 1931 1913 = 100	Oct., 1931 116	Nov., 1930 116	Dec., 1926 159	Aug., 1931 113
Electric Railway Wages*	Nov., 1931 1913 = 100	Oct., 1931 231.9	Nov., 1930 231.9	April, 1931 233.2	Dec., 1926 226.3
Electric Ry. Construction Cost*	Nov., 1931 Am. Elec. Ry. Assn. 1913 = 100	Oct., 1931 164	Nov., 1930 165	Nov., 1928 194	Nov., 1931 206
General Construction Cost	Nov., 1931 Eng'g News-Record 1913 = 100	Oct., 1931 169.3	Nov., 1930 169.8	Jan., 1927 198.5	Nov., 1931 211.5
Wholesale Commodities	Oct., 1931 U. S. Bur. Lab. Stat. 1926 = 100	Sept., 1931 68.4	Oct., 1930 69.1	Sept., 1928 82.6	Oct., 1931 100.1
Wholesale Commodities	Nov., 1931 Bradstreet 1913 = 9.21	Oct., 1931 8.09	Nov., 1930 8.30	Jan., 1928 10.06	Nov., 1931 13.57
Retail Food	Oct., 1931 U. S. Bur. Lab. Stat. 1913 = 100	Sept., 1931 119.1	Oct., 1930 119.4	Dec., 1926 144.4	June, 1931 161.8
Cost of Living	Sept., 1931 Nat'l. Ind. Conf. Bd. 1923 = 100	Aug., 1931 85.6	Sept., 1930 85.9	Nov., 1926 95.4	Sept., 1931 104.0
General Business	Nov. 7, 1931 The Business Week Normal = 100	Oct. 10, 1931 67.8	Nov. 8, 1930 72.5	Oct. 6, 1928 80.1	Oct. 31, 1931 117.6
Industrial Activity	Oct., 1931 Elec. World, kw.-hr. used 1923-25 = 100	Sept., 1931 97.1	Oct., 1930 100.4	Feb., 1929 103.2	Oct., 1931 140.4
Bank Clearings	Oct., 1931 Outside N. Y. City 1926 = 100	Sept., 1931 57.9	Oct., 1930 63.4	Oct., 1929 81.5	Oct., 1931 111.8
					Oct., 1931 57.9

*The four index numbers marked with an asterisk are computed by Mr. Richiey. Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation

and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 116 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

†Revised.

Material Prices

November 25, 1931

Metals—New York

Copper, electrolytic, delivered, cents per lb..	\$6.50
Lead.....	3.85
Nickel, ingot.....	35.00
Zinc.....	3.50
Tin, Straits.....	23.00
Aluminum, 98 to 99 per cent.....	22.90
Babbitt metal, warehouse	
Commercial grade.....	34.25
General service.....	28.50

Track Materials—Pittsburgh

Standard steel rails, gross ton.....	\$43.00
Track spikea, $\frac{1}{4}$ -in. and larger, per 100 lb.....	2.70
Tie plates, steel, cents per 100 lb.....	1.85
Angle bars, cents per 100 lb.....	2.75
Track bolts, per 100 lb.....	3.90
Ties, 6m.x8m.x8 ft.	
White Oak, Chicago.....	1.05
Long leaf pine, New York.....	1.00

Waste—New York

Waste, wool, cents per lb.....	10.00
Waste, cotton (100 lb. bale), cents per lb.:	
White.....	6.00-8.00
Colored.....	5.00-7.00

Wire—New York

Bare copper wire, cents per lb.....	8.50
Rubber-covered wire, No. 14, per 1,000 ft.....	3.75
Weatherproof wire base, cents per lb.....	10.50

Paint Materials—New York

Linseed oil (5 bbl. lots), cents per lb.....	8.40
White lead in oil (100 lb. keg), cents per lb.....	13.25
Red lead in oil.....	14.75
Turpentine (bbl. lots), cents per gal.....	46.25
Putty in linseed oil, 100 lb. tubs, cents per lb.....	5.50

Hartware—Pittsburgh

Wire nails, per kg.....	\$1.90
Sheet iron (24 gage), cents per lb.....	2.40
Sheet iron, galvanized (24 gage), cents per lb.....	2.90
Auto body sheets (20 gage), cents per lb.....	3.10
Fender stock (20 gage), cents per lb.....	3.15

Bituminous Coal

Pittsburgh mine run, net ton.....	\$1.25-1.35
Central Ill. screenings.....	0.50-1.00
Kansas screenings, Kansas City.....	1.25
Big seam, Ala., slack.....	0.60-1.25
Smokeless mine run, Chicago.....	1.50-2.00

Paving Materials

Paving stone, granite, 5 in., f.o.b.:	
New York — Grade 1, per thousand.....	\$120.00
Wood block paving $\frac{3}{4}$ in. 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.00
Paving brick, $\frac{3}{4} \times 8 \times 4$, N. Y., per 1,000 in. carload lots, f.o.b.	50.00
Paving brick, $\frac{3}{4} \times 8 \times 4$, N. Y., per 1,000 in. carload lots, f.o.b.	45.00
Crushed stone 1-in., N. Y. wholesale, f.o.b., per cu.yd.	1.85
Cement, Chicago, in carload lots, without bags, delivered.....	1.95
Gravel, $\frac{1}{2}$ -in., N. Y. cu.yd., wholesale, f.o.b.....	1.60
Sand, cu.yd., wholesale, f.o.b.....	1.00
Asphalt, in pkg. N. Y., f.o.b. ref., per ton.....	16.00

Scrap—New York

Heavy copper, cents per lb.....	4.35
Light copper.....	3.60
Heavy brass.....	2.15
Zinc.....	1.50
Lead, heavy.....	2.50
Mixed babbitt.....	3.00
Battery lead plates.....	0.85
Cast aluminum.....	4.75
Sheet aluminum.....	8.25
Auto radiators.....	2.35
Tires, standard, mixed, per ton.....	\$3.00
Inner tubes, mixed, per cwt.....	\$1.20

Old Material—Chicago

Steel car axles, net ton.....	\$10.75
Cast iron car wheels, gross ton.....	8.75
Steel car wheels, gross ton.....	8.25
Leaf springs, gross ton.....	9.75
Angle bars, gross ton.....	8.50
Brake shoes, net ton.....	6.00
Steel rails (short), gross ton.....	10.25
Relaying rails, gross ton (65 lb. and heavier)	24.05
Machine shop turnings, gross ton.....	4.25
Coil springs, gross ton.....	9.75
Frogs, switches and guards, gross ton.....	8.00

DO YOU BELIEVE IN DEATH CONTROL?



**PEACOCK STAFFLESS BRAKES
HELPED REDUCE THE DEATH RATE
IN 1930-31 TO ONE IN 600,000,000
PASSENGERS CARRIED!**

**THEY ARE THE ONE BEST BET
IN ANY EMERGENCY!**

**PEACOCK STAFFLESS BRAKES—FAST—
POWERFUL—SAFE—WEAR-COMPENSATING**

NATIONAL BRAKE COMPANY, Inc.

890 Ellicott Square, Buffalo, N. Y.

Canada:—Lyman Tube & Supply Co., Ltd., Montreal

The Ellcon Co., General Sales Representative, 50 Church Street, New York City

IN THE LEAD

THROUGHOUT THE WORLD THERE ARE IN SERVICE NEARLY 150,000

SKF JOURNAL BEARINGS



ANOTHER
"PERFORMANCE" USER
*Pittsburgh Street
Railway Company*

WHERE PERFORMANCE TAKES PREFERENCE OVER PRICE

Mile a minute speeds are quite common on the fifteen inter-urban cars of the Pittsburgh Street Railways Co. and all of them are SKF equipped . . . a total of 120 Journal Bearings. The cars weigh 49,500 pounds each, seat 52 passengers and operate on a 32-mile line, making the run including stops in one hour and twenty minutes. In this modernization program there was no question of what bearing to buy . . .

You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that cost so little.

SKF Performance Takes Preference Over Price.

Throughout the world there is this same preference to the tune of over 50,000 SKF's on street railways. There



are also approximately 100,000 SKF Journal Bearings on steam railroads of the leading countries. Such universal acceptance is conclusive evidence that "A Promise is only a Promise but SKF Performance is History."

SKF INDUSTRIES, INC. 40 EAST 34th STREET, NEW YORK, N. Y.

2814

SKF

Ball and Roller Bearings

"TYPE K"
means
SPLIT BASE 
Rims

**the Rims designed to
 meet modern truck
 tire conditions**

Now that pneumatic tires are the most successful tires for trucks — you need rims that make tire changing easy.

You get those rims in the Goodyear Type K.

Split base — to take all the fight out of changing tires.

Continuous, locked-on ring for safety.

Open-end valve slot for speed in handling the tube.

A rim that works as well on a tire for a one-ton truck — or a five-ton.,

Find out how these rims can save time and money on your wheels. Write to Rim Department, The Goodyear Tire & Rubber Company, Inc., Akron, Ohio.



K-28

for 28° bevel mountings
 Sizes: 5", 6", 7", 8"
 and 9-10"

"THE MAN WHO CHANGES THE TIRES

LIKES K RIMS"

GOOD  **YEAR**

K-28

RIMS

K-18

... YOUR
POWER
DOLLAR
... HOW
MUCH OF IT
IS LOST EACH
WINTER? ...

Power costs per car-mile are higher during the winter months. Added frictional resistance in the journal bearings accounts for a substantial part of this extra cost. High viscosity oils absorb power unnecessarily. That is one penalty imposed by cold weather!

But this annual loss is now avoidable. The new Texaco System of Lubrication entirely overcomes this excessive winter expense.

The new Texaco System of Car Journal Lubrication with Texaco Lovis Oil is saving the electric railway industry



thousands of dollars annually in this one item alone. In addition, it reduces oil-house labor costs, makes the use of heated waste soaking tanks unnecessary and eliminates completely the need for seasonal oil changes!

The combined savings are important. Operating executives who have put the new

Texaco System into effect have demonstrated actual economies that are far-reaching.

The Texas Company will be glad to present the facts to any interested executive—or arrange for conclusive tests. Many of the country's leading roads have adopted the Texaco System for all cars. Write The Texas Company.

THE TEXAS COMPANY, 135 East 42nd Street, New York City



TEXACO LUBRICANTS

AN Announcement

EFFECTIVE January 1, 1932, Electric Railway Journal will become TRANSIT JOURNAL.

For 48 years Electric Railway Journal (and its predecessor, Street Railway Journal) has pioneered in the advancement of public transportation. It started with the horse car era. It helped make cable car history.

With the development of the electric motor, the paper foresaw the great possibilities of the electric rail car and the name of the Street Railway Journal was subsequently changed to Electric Railway Journal.

For a generation the electric street car remained almost the sole method of public transit. Then transportation methods again began to change. Today the electric street railway is still a vital phase in community transit but it is not the only element. It has been supplemented by rapid transit lines, motor buses, trolley buses and taxicabs. A great many electric railways have adopted one or more of the newer forms of transportation.

It has been a long step from the simple equipment of the horse car era of the '80's to the wide range of transportation tools used in modern city transit. The electric railway operator of yesterday is a transit merchant today, operating or interested in all methods of transportation, recognizing that each has its economic place in the general scheme of rendering service to the riding public.

By adopting a broader name—one which more accurately reflects its actual field of interest—the Journal will be better able to serve this tremendously important community transit industry. For that reason the name will be changed January 1, 1932, to

TRANSIT JOURNAL

Public Transportation—City, Suburban, Interurban



Reciprocating Track Grinder



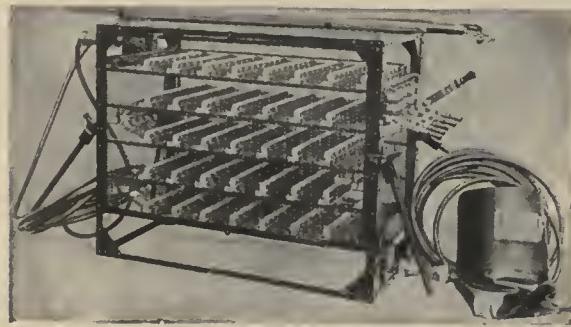
Vulcan Rail Grinder



Enreka Radial Rail Grinder



Improved Atlas Rail Grinder



Ajax Electric Arc Welder

The road to recovery - - -

WHETHER clearly visible or not, whether or not it dips out of sight into valleys, one thing is certain:

Only well maintained track will get and hold traffic.

For economical track maintenance, nothing equals electric arc rail welding and rail grinding. The equipment is available. It costs less to buy it and use it now than to postpone the purchase.

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

AGENTS

Chester F. Gailor, 50 Church St., New York
 Chas. N. Wood Co., Boston
 H. F. McDermott, 208 S. La Salle St., Chicago
 F. F. Bodler, San Francisco, Cal.
 H. E. Burns Co., Pittsburgh, Pa.
 Equipment & Engineering Co., London
 Railway & Welding Supply Company, Toronto, Ontario



There is and always will be definite need for the
products of fine mechanical equipment backed by
a will to create only "the best"

e. g.

TIMKEN

W O R M . D R I V E

FOR QUIET CARS, TROLLEY-BUSES, COACHES



THE TIMKEN-DETROIT AXLE COMPANY, DETROIT, MICH., U. S. A.



The Hudson Transportation Company has a fleet of 24 buses all equipped with Firestone Gum-Dipped Tires.

3,000,000 MILES with only 11 Road Delays

TWENTY-FOUR buses, operating one million miles per year. In the three years they have used Firestone Tires and service, the Hudson Transportation Company, Glens Falls, New York, reports "practically no road delays due to tire troubles, during the past three years, the total number being eleven during the entire period."

Every night the entire fleet is checked for air pressure, cuts, bruises, etc.—part of the Firestone service. As the Hudson people say:

"The Firestone Company is ever ready to cooperate to the fullest extent with our Operation Department . . . and to this service is due in no small measure the success of Firestone Tires."

Firestone service, like Firestone Truck and Bus Tires, represents the development of many years of close daily contact with fleet operators in all sections of the country. It can cut YOUR operating costs, too. Find out. Ask your nearest Firestone dealer *how*. You'll be glad you investigated Firestone Tires and Firestone Service.



Firestone BUS BALLOON

LISTEN TO
The Voice of Firestone
EVERY MONDAY NIGHT
OVER N. B. C. NATIONWIDE NETWORK

Firestone COMPLETE SERVICE

TIRES • TUBES • BATTERIES • RIMS • BRAKE LINING • SPARK PLUGS • ACCESSORIES
Copyright, 1931, The Firestone Tire & Rubber Co.



Merry Christmas

BARRON G. COLLIER, INC.

Better Pole Lines are Being Built with **MONOTUBE POLES**

ELECTRIC railway officials were among the first to use Union Metal Poles when they were introduced some years ago. Today Fluted Steel and Monotube Poles are being used in many of our largest cities. They are supporting span wires and feeder lines and, in joint service with other utilities, they are carrying distribution lines, street lighting units and traffic signals. Wherever they are used they are doing a better job.

Union Metal Poles are made in one piece from high grade steel, with an electric welded vertical seam and then cold rolled. The poles possess unusual strength; they have no horizontal joints; they are attractive; they will take an abnormal load without a permanent set — factors which provide simple, economical installation and maintenance and long efficient service.

And so we say, better pole lines are being built with Union Metal Poles. If you would like to see for yourself, we would be glad to refer you to an installation of Fluted Steel or Monotube Poles in your locality.



THE UNION METAL MANUFACTURING COMPANY

GENERAL OFFICES AND FACTORY . . . CANTON, OHIO



SALES OFFICES . New York . Chicago . Boston
Los Angeles . San Francisco . Dallas . Atlanta



DISTRIBUTORS

General Electric Merchandise Distributors Graybar Electric Company, Inc.
Offices in all principal cities



● Monotube Poles Installed In
Denver, Colorado

UNION METAL MONOTUBE POLES



Is this your problem?

*Must operating costs
be balanced
to meet thin revenues?*

Is this your problem?

Is traffic light?

Are operating costs out of line?

Will riding on that planned extension be heavy enough to meet expenses?

Is this your problem?

Then these verified records of

"15.39 cents a mile" operating costs should interest you.

What ten widely operated small city operators are averaging—you can average.

But— You can't get low operating costs like theirs *with any ordinary vehicle.*

	Popu- lation	Cost Per Mile (Cents)
Company A	21,790	15.22
Company B	129,710	14.84
Company C	13,780	15.13
Company D	76,660	14.58
Company E	76,900	15.30
Company F	39,610	16.20
Company G	31,080	15.01
Company H	5,660	15.35
Company I	45,740	16.80
Company J	16,690	15.49
Average		15.39

COMPANY D

Expenses	Avg. Per Coach Mile (cents)
Drivers	1.88
Gas & Oil	2.27
Tires	0.87
Maintenance	2.61
Taxes	0.50
Insurance	1.11
General	3.59
Depreciation	1.75

Total 14.58

The details of these and other operating statements of users will be supplied to interested operators upon request.



COMPANY H

Expenses	Avg. Per Coach Mile (cents)
Wages	7.09
Gasoline & Lubrication	1.97
Parts and Supplies	0.45
Tires and Tubes	0.78
Garage Expense	0.15
Advertising and Miscel.	0.70
Insurance	1.09
Taxes and Licenses	0.12
Depreciation	3.00
Total	15.35

...15.39¢ average cost

*Nation-wide records
prove the low cost of operating
Yellow 21-passenger Coaches*

From all parts of the country evidence has been growing and accumulating in regard to the extraordinary low operating cost, satisfactory performance and long life of Yellow 21-passenger coaches—Type W and Type U—two coaches of basically similar design.

Over two years ago, General Motors Truck foresaw the industry need of a coach of 21-passenger capacity that would be attractive, safe and comfortable, and that in addition would have exceptionally low operating cost and long service life.

YELLOW
type
U&W
21 PASSENGER
Parlor Coach



Experienced operators aided in the development of the design. General Motors engineers, backed by vast research laboratories and testing facilities aimed for lasting excellence, regardless of first price, to insure a true low cost per mile of operation and a low depreciation rate.

Cost records, based on millions of miles of actual service, now verify the soundness of the judgment which dictated this original design and foresighted manufacturing policy.

Now, from points all over the country, operators are enthusiastically reporting results *as proven by their cost records*.

Many are reporting 7 and 8 miles to the gallon in city service, less than 2 cents a mile for maintenance, better than 40,000 miles on

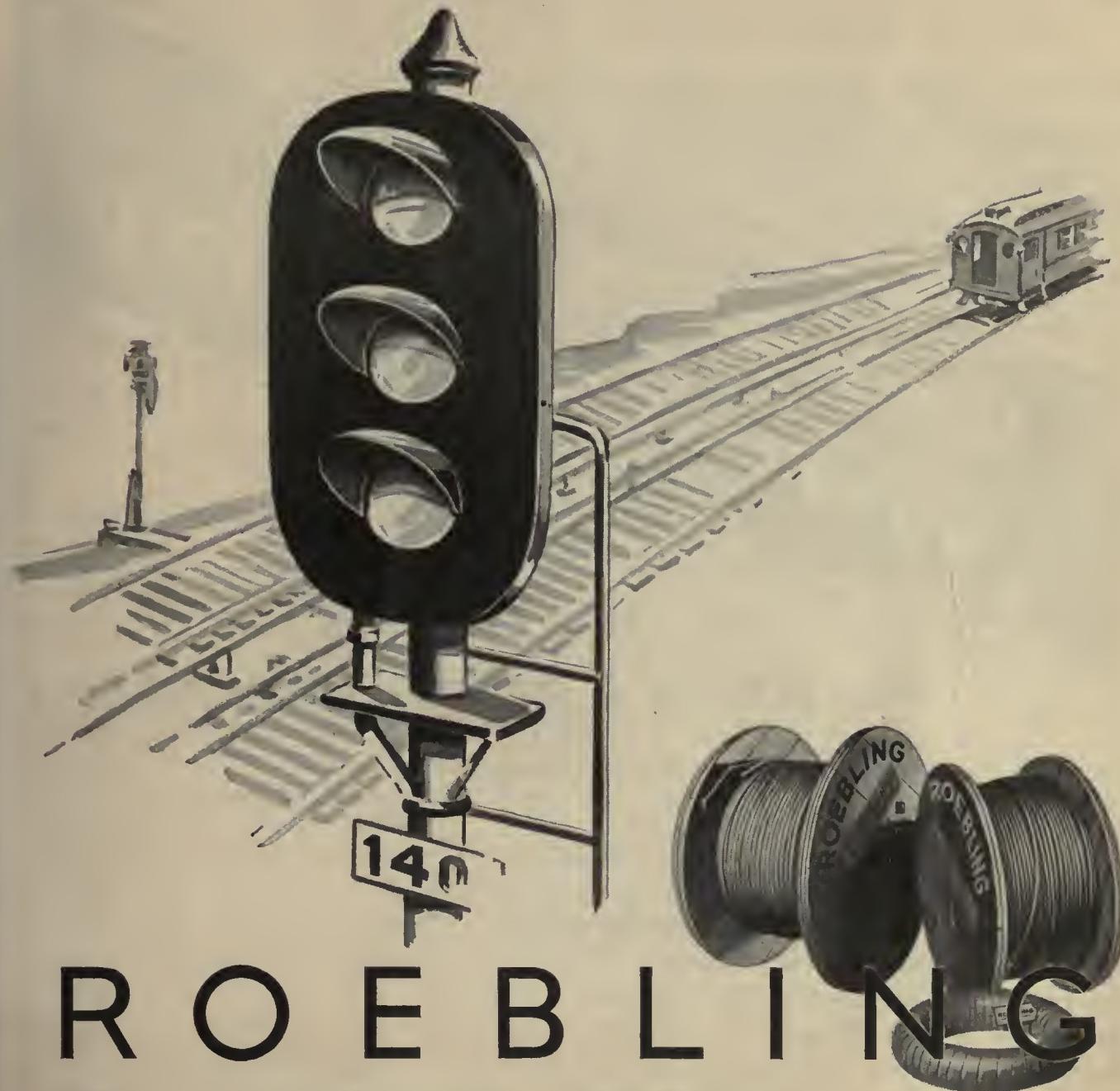
tires, better than 50,000 miles with brake lining, better than 100,000 miles without engine tear-down or rebore.

And they back up these amazing statements with detail operating figures that show total operating costs of less than 15 cents a mile. Even under widely different operating conditions, difference in personnel, experience, and wages paid, the summary of ten different companies listed, shows an average total cost of only 15.39 cents a mile.

Regardless of varying conditions, we know now that almost any operator can approximate the low operating costs being obtained by so many users of this type of equipment. Interested operators are invited to inquire for further detailed evidence.

GENERAL MOTORS TRUCK CO., *Subsidiary of Yellow Truck & Coach Mfg. Co.*, Pontiac, Michigan

*It can be done - with
Yellow
Coaches*



ROEBLING

When you need signal wires and cables—or any other types of wires and cables for electric railway use—remember that Roebling makes all. In fact, the Roebling Line ranges from magnet wire for winding coils to heavy High Tension Lead Sheathed Power Cables.

Roebling is equipped to give you prompt service, too. Quick shipment of standard types of wires and cables can be made from all warehouse points below.

We would be glad to have an opportunity to furnish information and prices regarding any of the Roebling Wires and Cables listed.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
 Atlanta Boston Chicago Cleveland Los Angeles New York
 Philadelphia Portland, Ore. San Francisco Seattle Export Dept.—New York, N.Y.

Railway Signal Wires and Cables » Parkway Cables » Power Cables; Paper, Cambric, Rubber; Braided or Leaded » Car Wire » Locomotive Wire » Bronze Trolley and Contact Wire » Copper Trolley and Contact Wire » Copper Transmission Strand » Guy Wire and Strand » Bond Wires » Ground Wires » Welding Cable; Trailing and Electrode Holder » And a wide variety of other Wires and Cables.

ELECTRICAL WIRES AND CABLES

The SAFETY CAR CONTROL EQUIPMENT

Helps Win another Coffin Award....

THE Milwaukee Electric Railway and Light Company has won the Coffin Award for 1931 by "continuity in progress" . . . Many factors have contributed to this achievement—for example, the Safety Car Control Equipment, with latest improvements, has assured safer, more economical, and faster car operation . . . Practically every other winner of the Coffin Award has been a user of this equipment.

SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:

WILMERDING, PA.

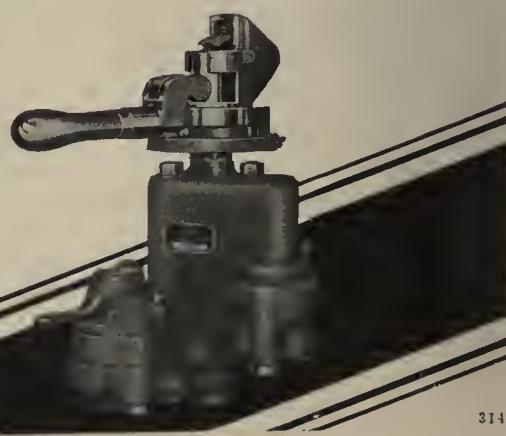
CHICAGO

WASHINGTON

SAN FRANCISCO

PITTSBURGH

NEW YORK



DOWN TO SEE SOME SHIP BOLTS

WENT A GROUP
OF ENGINEERS

Galvanized bolting material has
its own fit and finish require-
ments...an R B & W case history

A LARGE American republic had placed orders for construction of naval destroyers and scout cruisers. The ship building company which received the contracts ordered galvanized bolts from R B & W, to be made in accordance with the specifications furnished by the navy department of the government that had ordered the vessels.

But the specifications required a fit of bolt and nut which is not necessary in marine work, and which, in galvanized material, required reducing the thickness of the galvanized coating, with a consequent weakening of protective resistance to the ravages of the elements. The

R B & W order department sent the order to our Engineering Service department for instructions. (Of course, it would have been a simple matter to overlook the faulty specifications and ship the order as requested.)

After considerable correspondence and other negotiation, the R B & W Engineering Service arranged to call on the navy's construction engineers and specification

writers with a representative of the ship builders. A brief demonstration and explanation with specimen galvanized bolts resulted in a consent to revise the specifications and a ruling that bolt and nut fits as furnished by R B & W would be approved by the inspectors.

When you have a problem in the correct specification and use of bolting material, put it up to the R B & W Engineering Service.



RUSSELL, BURDSALL & WARD BOLT & NUT CO.

ROCK FALLS, ILL.

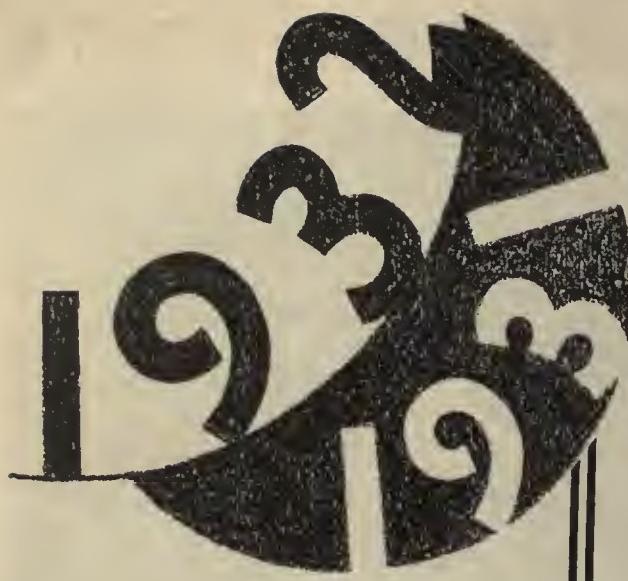
PORT CHESTER, N. Y.

CORAOPOLIS, PA.

Sales Offices at Phila., Detroit, Chicago, San Francisco, Los Angeles, Seattle, Portland, Ore.



A pickling room operation in an R B & W plant, in which scale and dirt are removed from raw materials.



The new year is almost here. What kind of a year it will be we don't know. But—we do know that many transportation companies will enjoy increased revenue through the active selling of their service to the public.

In some cases, this will mean revision of transfer design to offer additional transfer privileges or to prevent transfer abuse.

Other properties undoubtedly will adopt various forms of Globe "Bargain Fare" Passes to sell offpeak riding and to obtain cash in advance.

Still others will adopt the new Bell Punch Ticket System for absolute safety in ticket sale and use, on suburban lines. The automatic Hyman Register will help others solve their cash and token problems.

Whatever the conditions, Globe Ticket Specialists are particularly capable of helping you modernize your fare system.

Consult them.

GLOBE TICKET COMPANY

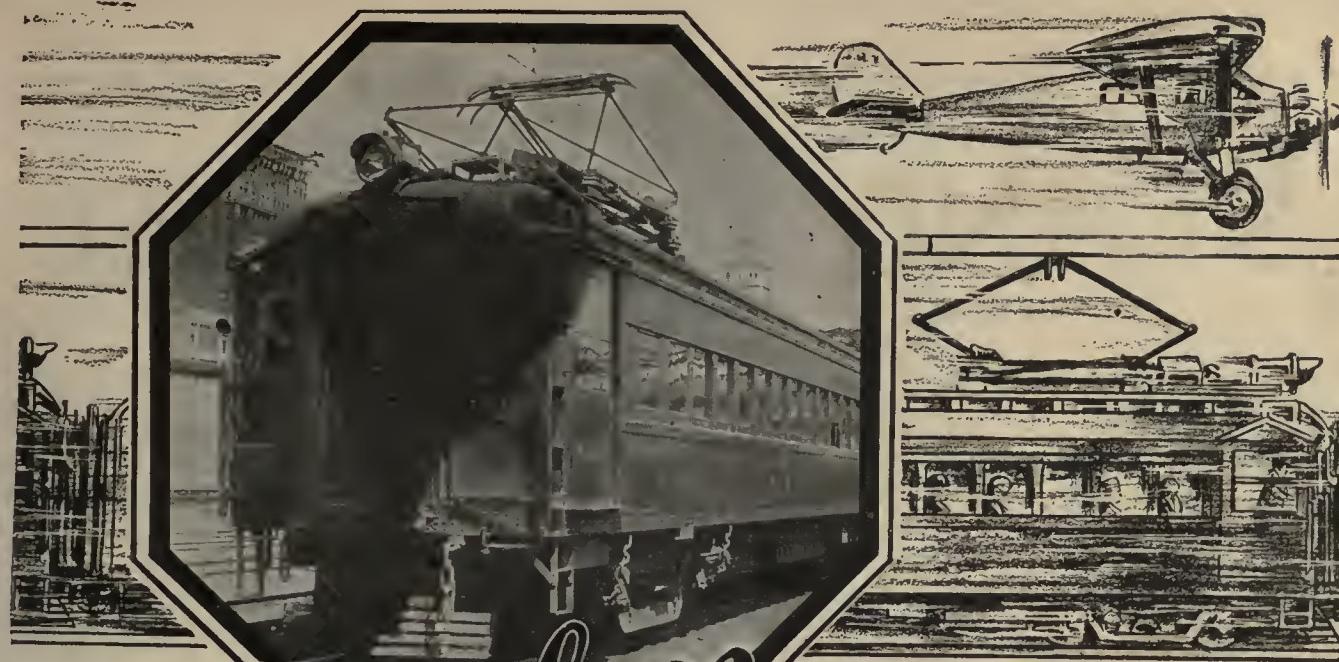
PHILADELPHIA

FACTORIES:
Philadelphia Los Angeles
Boston New York
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SALES OFFICES:
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*Now is
the time to
make sure
that your
fare system is
geared up for
1932
operation*

**LET
OUR EXPERIENCE
HELP YOU!**



Simplex

Multiple Unit Clasp Brakes

Speed is today's byword. Greater Speed, faster service, better schedules—these are the demands on practically every transportation organization today.

Without a doubt deceleration is as important a factor in maintaining schedules as acceleration or running speed. It's the *most important* factor where speed with safety is concerned.

Simplex Multiple Unit Clasp Brakes offer today's method of braking to meet today's demands in speed. Two brake shoes per wheel *double* the braking area and *halve* the wear on braking equipment.

Balanced braking has *many* advantages. Study the features outlined here. Details and blueprints will be sent at your request.

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GENERAL OFFICES & WORKS: BURNHAM, PA.

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The first shipment of an Allis-Chalmers Mercury Arc Power Rectifier consisted of a 3,000 kw. unit and was made in 2½ months after the rectifier business was acquired. Six other 3,000 kw. rectifier plants are nearing completion.

The Mercury Arc Power Rectifier

business, which was taken over when Allis-Chalmers purchased the principal assets of the American Brown Boveri Co., Inc., of Camden, N. J., has been readily absorbed into the Allis-Chalmers shops at Milwaukee. The key men of the engineering and shop organization from Camden are now fully established at the Milwaukee plant, and the manufacture of Rectifier plants for current orders is in full swing.

Allis-Chalmers Mercury Arc Power Rectifiers are built according to the designs and experience of Brown Boveri & Co., Ltd., and are backed by the organization and resources of Allis-Chalmers.



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CLEAN AND STRAIGHT IN THE TREE

Clean and Straight in the Stick

Dixie Poles are cut from Dixie's own timber—clean bodied Long Leaf Yellow Pine grown on our own holdings and graded uniformly in our big sorting

yard by our own inspector. Look for the Dixie Trade Mark on every stick. It guarantees 100 per cent Long Leaf Yellow Pine—and enduring service.



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Alabama

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ENCLOSED HEATING elements carry the Underwriters' Laboratories Label. They give 100% energy output for what you put in.



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J. H. DENTON, Eastern Mgr.
1328 Broadway, New York



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SPECIAL CARBON STEEL
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LARGE WEAR SURFACES
FREE ROLLER
ONLY TWO PARTS

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Isn't it a satisfaction to know that year in and year out, the products you are using will serve economically, and never disappoint you?

That is why so many of the Electric Railway Systems here and abroad have standardized on—

"ARMATURE" BABBITT METAL



WHEN YOU THINK OF RELINING ARMATURE BEARINGS—THINK OF "ARMATURE" BABBITT METAL

NATIONAL BEARING METALS CORP.
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Until January 1st, 1932, we will stamp your name, or a friend's name, in gold on the front cover of this book. Orders for stamped copies should be accompanied by price and, of course, stamped books are not returnable. Offer expires January 1st, 1932.

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Electric railway executives, engineers, and operating men have long respected Richey's ELECTRIC RAILWAY HANDBOOK as the one great pocketbook of practice data, formulas and tables in the electric railway field. It covers every phase of electric railway work from Roadbed and Track to Signals and Communication.



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It presents

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Send me RICHEY'S ELECTRIC RAILWAY HANDBOOK, \$4.00, with name stamped in gold on front cover. I enclose proper remittance and understand that stamped books are not returnable. (This offer expires Jan. 1, 1932.)

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E. 12-31

THIS IS THE TIME FOR SPECIAL EFFORT AND FOR SPECIALISTS

RAILWAYS today are making special efforts to increase the number of riders and reduce their operating costs, and for these purposes are largely relying on the aid of specialists.

Specialists in public relations suggest various ways and means by which to attract more riders.

Specialists in the manufacture of motors suggest improved types of motor equipment which make it possible to save power and money.

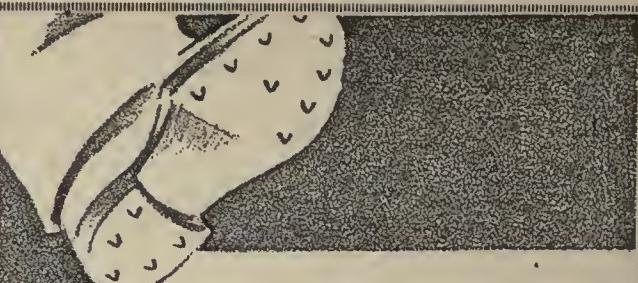
Specialists are also utilized in saving money in the stopping of cars and trains.

The leadership of American Brake Shoe and Foundry Co. in the field has been recognized for many years by operating officials generally. Many of the most important transportation systems have learned the true meaning of economy and efficiency in braking through the use of Diamond S brake shoes—the product of thousands of laboratory and service tests.

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TUCOLITH **FLEXOLITH** Long Wearing

Even the rough brogans of stamping workmen do not injure the hard, tough surface of Tucolith floors.

6 REASONS WHY

Tucolith is the popular flooring material for cars and busses.

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Now Ready!

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New 1931
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Send for your free copy today!

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It Costs Less TO BOND than NOT TO BOND

And now that the budgeting of 1932 expenditures is here, make sure that bonding is given full consideration. Each added foot of joint resistance caused by inefficient bonding is directly responsible for an increase in power costs. The power losses chargeable to a joint testing only two feet more than standard are sufficient to pay the cost of installing a new bond in less than a year.

Bad joints have a habit of growing worse instead of better—losses increase steadily. Eliminate this unnecessary item of expense by including Erico bonds in your 1932 budget.

Electric Railway Improvement Co.

2070 East 61st Place, Cleveland, Ohio

CHOSEN for PERFORMANCE

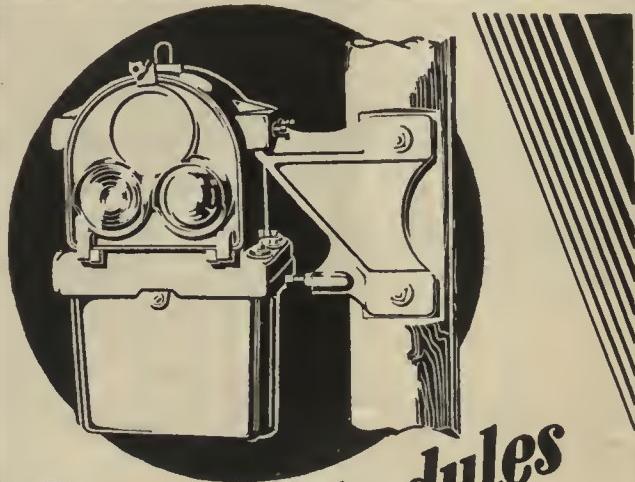
TROLLEY wheels are never chosen for looks, never selected because one kind costs a little more or less than another. They're chosen for performance. That's why

KALAMAZOO



trolley wheels and harps are the standard of comparison today. That's why many properties use them exclusively. There's a difference in trolley wheels. May we tell you about it?

THE STAR BRASS WORKS
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Nachod Automatic Block Signals, operating independently of the train crew, insure safe, fast operation and eliminate vexatious delays at switches. They take chance and memory out of the picture... provide maximum safety under all conditions of operation. Block and Highway Crossing Signals, Headway Recorders and Nachod & U. S. Signal Co., Inc., Louisville, Ky.

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Closes December 23rd

Early receipt of copy and
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you best—to furnish proofs
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corrections may be made if
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ELECTRIC RAILWAY JOURNAL

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The P. Edward
Wish Service

50 Church St., NEW YORK

Street Railway Inspection
DETECTIVES

131 State St., BOSTON

A
Personal
Want—

can invariably
be filled by
a friend.

The Searchlight Section

of this issue covers the current
business wants of the industries
in which this paper is read.

For Every Business Want
"Think SEARCHLIGHT First"

A
Business
Want—

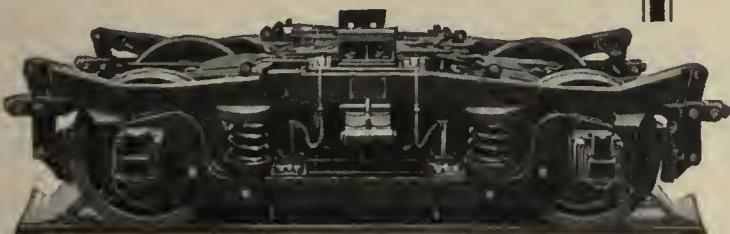
must be satisfied
by someone in
your industry.

0134

COMMONWEALTH

TRUCKS

CAST STEEL FRAME
INCLUDING
CROSS TRANSOMS
AND PEDESTALS
. ONE
STRONG UNIT



E Q U A L I Z E D “SWING MOTION TYPE”

They contribute to operating economy

Where operating conditions are severe, Commonwealth Trucks are fully demonstrating their real worth. Structural simplicity and strength combine to make these trucks highly economical over long periods of time. Commonwealth Trucks are designed for both street car and interurban service. We will be glad to send you complete details and we offer you our full cooperation.

**GENERAL STEEL
CASTINGS CORPORATION**

PANTASOTE

TRADE MARK

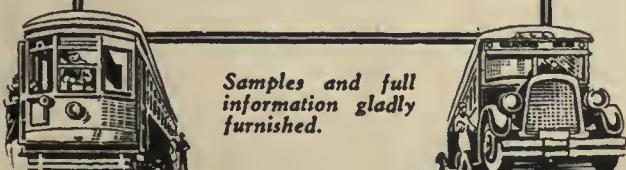
—the car curtain and upholstery material that pays back its cost by many added years of service. Since 1897 there has been no substitute for Pantasote.

AGASOTE

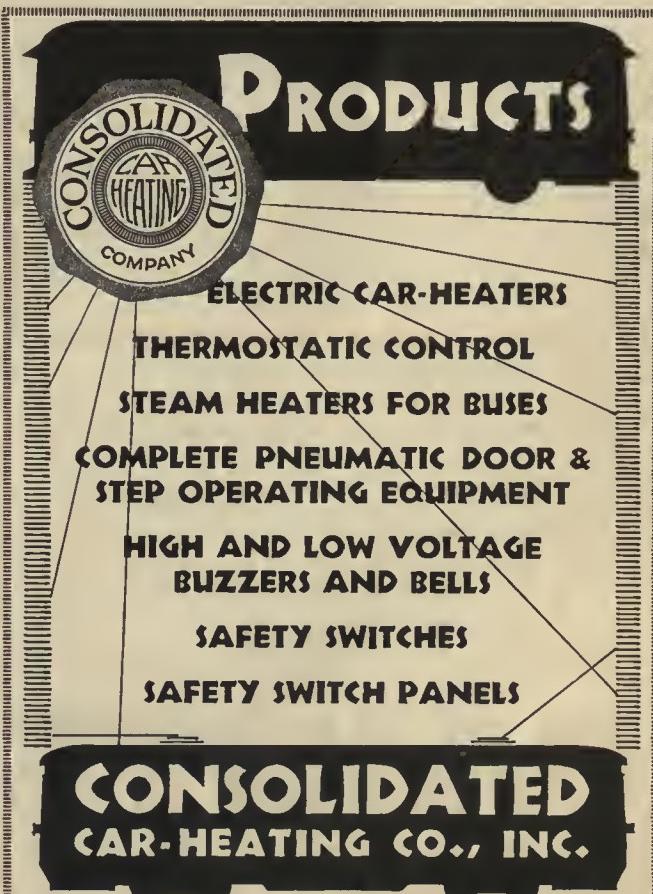
TRADE MARK

—the only panel board made in one piece. It is homogeneous and waterproof. Will not separate, warp or blister.

**Standard
for electric railway cars
and motor buses**



The PANTASOTE COMPANY, Inc.
250 Park Avenue NEW YORK





SAVE money... get better results washing floors, paint stripping, or cleaning parts with OAKITE

FOR every bus shop cleaning job there is an Oakite material that will do the work speedily . . . safely . . . at low cost!

Floors, for instance! Muck and grease covered floors are quickly cleaned to the concrete with minimum effort. Fire and explosion hazards are eliminated. Scraping and scrubbing are required only on the most difficult jobs.

And paint stripping! Quick-acting materials remove the old paint in jig time. Bus and car bodies stripped the Oakite way are easily and completely rinsed off, assuring an even, permanently adhering refinished job.

Repair parts, too! The Oakite method of cleaning motors, transmissions, rear ends and other parts does away with the use of such dangerous materials as gasoline, benzine, etc. You make substantial savings in money, time and effort.

Profit by the 23 years' experience of our Nation-Wide service organization in connection with any cleaning job your shop presents. Let our nearby Service Man give you specific recommendations on your work. Write today . . . simply tell us your problem or ask questions . . . then leave the rest to us. No obligation, of course.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 28B Thames Street, NEW YORK, N. Y.

OAKITE
TRADE MARK REG. U. S. PAT. OFF.
Industrial Cleaning Materials and Methods

ALPHABETICAL INDEX

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

	Page
Allis-Chalmers Co.	31
American Brake Shoe & Foundry Co.	34
American Car Co.	Third Cover
American Steel Foundries	29
Beeler Organization	36
Bibbins, J. Roland	36
Brill Co., The J. G.	Third Cover
Buchanan & Laying Corp.	36
Bylesby Eng. Manag. Corp.	36
Collier, Inc., Barron G.	19
Consolidated Car Heating Co.	37
Electric Railway Improvement Co.	35
Electric Service Supplies Co.	7
Firestone Tire & Rubber Co., The	18
General Electric Co.	10
General Motors Truck Co.	Insert 21-24
General Steel Castings Co.	37
Globe Ticket Co.	28
Goodyear Tire & Rubber Co.	13
Jackson Lumber Co.	32
Jackson, Walter	36
Kelker, Jr., R. F.	36
Kuhlman Car Co.	Third Cover
Mack Trucks, Inc.	Back Cover
McGraw-Hill Book Co., Inc.	33
Metal & Thermite Corp.	8-9
Nachod and U. S. Signal Co.	35
National Bearing Metals Corp.	33
National Brake Co., Inc.	11
National Pneumatic Co.	5
Ohio Brass Co.	6
Oakite Products, Inc.	38
Pantasote Co., Inc., The	37
Paraffine Companies, Inc., The	40
Railway Track-work Co.	16
Railway Utility Co.	32
Roebling's Sons Company, John A.	25
Russell, Burdsall & Ward Bolt & Nut Co.	27
Safety Car Devices Co.	26
Searchlight Section ...	39
SKF Industries, Inc.	12
Standard Steel Works Co.	30
Star Brass Works, The	35
Stucki Co., A.	32
Texas Co., The	14
Timken Detroit Axle Co.	17
Timken Roller Bearing Co., The	Front Cover
Tuco Products Corp.	34
Union Metal Mfg. Co., The	20
Wason Mfg. Corp.	Third Cover
Westinghouse Elec. & Mfg. Co.	Second Cover
Westinghouse Traction Brake Co.	4
Wish Service, The P. Edw.	36
Yellow Coach	Insert 21-24
 Searchlight Section—Classified Advertising	
EMPLOYMENT	39
EQUIPMENT (Used, etc.)	39
Gordon & Gerber	39
Perry, Buxton, Doane Co.	39

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Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page. R.J.

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Let us handle this for you. We specialize in buying and dismantling entire railroads, street railways, industrial and public service properties which have ceased operation. We furnish expert appraisals on all such properties.

Consult us also about New and Relaying Rails—all weights and sections. You will like our service.

The Perry, Buxton, Doane Company

(Capital \$1,000,000.00)

Boston Office, P. O. Box 5253, Boston, Mass.

Pacific Sales Office—Failing Building, Portland, Oregon

FOR SALE

13—High speed Interurban Passenger Cars, light weight, complete, approximately 38,000 lbs., equipped with four General Electric 247 Motors, K control, full safety features, single end operation and including magnetic brakes. Cars are three years old, equipped with new Cincinnati type trucks, 28-in. wheels. Free running speed approximately 52 miles per hour, on 650 volts. By changing gear ratio, could be admirably adapted for city service.

4—1-motor Freight Cars, each equipped with Westinghouse 557, 150-hp. Motors, HL control, automatic air brakes.

5—300 kw., 33,000/445 volt, 60 cycle, 600 volt, D.C., Westinghouse Automatic Substation.

2—500 kw., 33,000/445 volt, 60 cycle, 600 volt, D.C., Westinghouse Automatic Substations.

1—500 kw., 33,000/445 volt, 60 cycle, 600 volt, D.C., Westinghouse Portable Automatic Substations.

10—Standard Interurban Box Cars.

5—Flat Cars.

10—Interurban Stock Cars.

6—Buda Section-motor Cars.

2—Buda Speeders.

Miscellaneous lot of Repair Parts, Track and Shop Material, Electrical Equipment, Standard Hardware, etc.

Terms can be arranged.

FS-258, Electric Railway Journal, 520 No. Michigan Ave., Chicago, Ill.

“SEARCHLIGHT”

Opportunity Advertising

—to help you get
what you want.

—to help you sell
what you no longer need.

Take advantage of it—For Every Business Want

“Think SEARCHLIGHT First”

Your OLD railway
equipment means
NEW business for us

WE WANT IT

We're ready with cold cash to relieve you of any serviceable electric railway equipment you are not using.

We turn your idle or surplus cars, poles, trackage, power house apparatus, etc., into useful equipment for others.

Send us a list of any equipment you wish to liquidate, and we'll make you an attractive offer.

Are you in the market for relaying rail? We can supply you—at the right price—

GORDON & GERBER

▼ 330 THIRD STREET ▼
CHELSEA, MASS.

POSITIONS WANTED

SUPERINTENDENT transportation: Broad experience, successful record, covering every phase of transportation. At present engaged. Salary, location secondary importance, available short notice, fine references, correspondence invited. PW-261, Electric Railway Journal, 330 W. 42nd St., New York.

YOUNG MAN desires position as assistant engineer for electric traction. Eight years in shops and graduate in electrical engineering. PW-260, Electric Railway Journal, 330 W. 42nd St., New York.

WANTED

ANYTHING within reason that is wanted in the field served by Electric Railway Journal can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

Circular Matter

Cannot Be Forwarded

Replies to box number advertisements in the Searchlight Section are not called for at our office, but must be remailed in new envelopes and under new postage at our expense.

Under the circumstances, we reserve the right to examine, question, and withhold any replies not offering the results sought in the advertisements.

Advertisers Want

Bona-fide Returns

HOW MASTIPAVE FLOORS REDUCE car building and maintenance COSTS



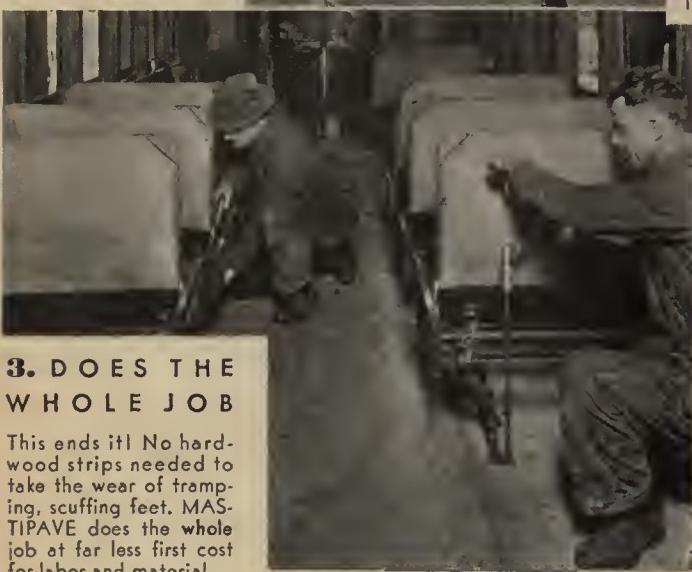
1. FIRST COST MUCH LOWER

MASTIPAVE Floor is itself low priced and easily and quickly laid over low-cost, softwood underflooring. No hardwood flooring needed.



2. WITHSTANDS HARDEST TREATMENT

So tough and durable is MASTIPAVE Floor that grinding punishment during car construction does not injure it.



3. DOES THE WHOLE JOB

This ends it! No hardwood strips needed to take the wear of tramping, scuffing feet. MASTIPAVE does the whole job at far less first cost for labor and material.



4. BETTER THAN STEEL

MASTIPAVE treads are far cheaper and much more durable than steel — and MASTIPAVE Flooring is NON-SLIP even when wet.

5. MAINTENANCE? ZERO!

No waxing. Simply mop off the dirt. MASTIPAVE Floors resist tramping, scuffing feet, dirt and grit, cigarette butts, any wear.

6. LOWEST COST PER YEAR OF SERVICE

One company operating 745 cars started using MASTIPAVE in a skeptical way six years ago. Now every car is floored with MASTIPAVE. Lowest first cost. Lowest cost per year of service.

THE PARAFFINE COMPANIES, INC.
475 Brannan St., San Francisco

Offices in the Principal Cities
Manufacturers of Pabco Multi-Service Paints, Varnishes, Lacquers and Enamels, Pabco Waterproofing Paints and Compounds, Pabco Flamite, Mastipave, Pabcobond and Other Products



WRITE FOR FREE BOOKLET

THE COTT-A-LAP COMPANY
Somerville, N. J.

THE LOW-COST,
LONG-LIFE
FLOOR COVERING 156

• • PABCO MASTIPAVE • •

December, 1931

ELECTRIC RAILWAY JOURNAL

STREAMLINED BY BRILL

Light-weight Hi-speed Cars

A still more attractive service is the goal of the Philadelphia & Western Railway in placing in service ten new Brill streamlined hi-speed cars.

Reduction of wind resistance by streamlined design and light-weight by the use of aluminum alloys throughout the construction combined with quadruple 100 H.P. motor equipment to increase schedule speeds appeal to the traveling public. A more pleasurable service is also obtained by a bright and cheerful interior decoration and comfortable Brill No. 202-F reversible seats.



THE J. G. BRILL COMPANY
PHILADELPHIA

CHICAGO OFFICE - HARRIS TRUST BUILDING
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THE J. G. BRILL COMPANY OF OHIO - CLEVELAND
THE J. G. BRILL COMPANY OF MANUFACTURING
SPRINGFIELD

50 MACK BUSES

Mack



*The Mack Model BT transit type bus. One of fifty ordered by the Brooklyn Bus Corporation,—
subsidiary of Brooklyn Manhattan Transit Corporation*

The Brooklyn Bus Corporation chooses the Mack Model BT for operation on its congested Brooklyn routes.

The Model BT is completely Mack-designed and Mack-built . . . body and chassis . . . to standards which have established the Mack tradition for quality construction. In addition there are these exclusive Mack-engineered features which make it the ideal unit for urban mass transportation:

Extra Wide Entrance, Aisle, and Center Exit: Speeds up the movement of passengers; cuts stopping time.

Power Steering: Engine power makes it possible for the driver to steer the bus with one hand, even at a standstill. This means shorter time to

swing into and away from the curb, and lessens driver fatigue.

Inverted Dual Reduction Drive Shaft: This arrangement permits the drive shaft to be slung below the level of the axles, thus materially lowering the height of the floor over the rear axle. Full floating rear axle.

Inside Engine Mounting at the Front: Utilizes space normally not used; keeps passengers from crowding near the driver; does not interfere with seating. An insulated covering keeps engine odors and noise out of the bus.

The Mack Model BT is a bus that should not be overlooked in buying equipment for city service. May we send you a more comprehensive description?

MACK TRUCKS, INC., 25 BROADWAY, NEW YORK, N.Y.







